

9150

PH. SCHUSTER, PAPIERHANDLUNG

I.

V. S. 1892/93

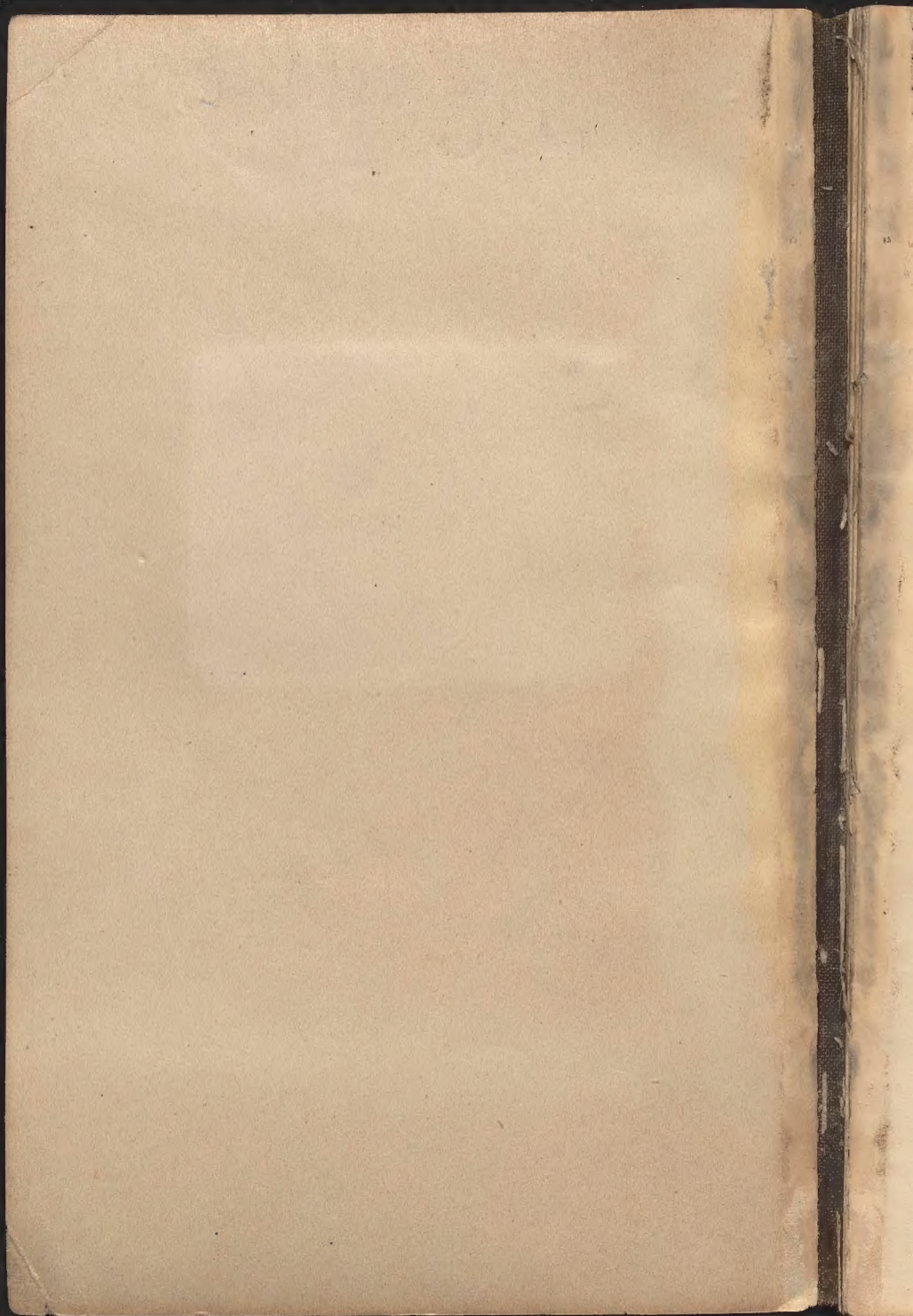
Dr. Emil Weyr

Analytische Geometrie des

Rammes

Smoluchowski

Wien, Wieden Hauptstrasse 55.







2.8

17/

9

7

17/10

BJ

2



$P'P''P''' = \text{orthog. Ang.}$

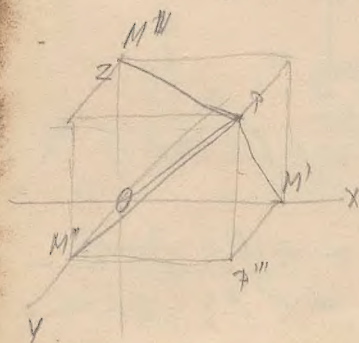
$\therefore \text{long.} \sim \dots$

8 Octanten  
 $+u - v - w$   
 Ang.  $\text{for } P+u-v-w$

$+x$	$+y$	$+z$	
+	-	+	} \text{ wad } XY
-	+	+	
-	-	+	
+	+	-	} \text{ Pol}
+	-	-	
-	+	-	
-	-	-	

$\left. \begin{matrix} x=a \\ y=b \\ z=c \end{matrix} \right\} \sim \dots$

$\therefore C. \sim P \text{ and } C \text{ contains } \omega$



$$OM' = P'P = x$$

etc.

$$P \text{ on } OP = \sqrt{P} = \frac{1}{2}$$

$$PM' \perp X \text{ or}$$

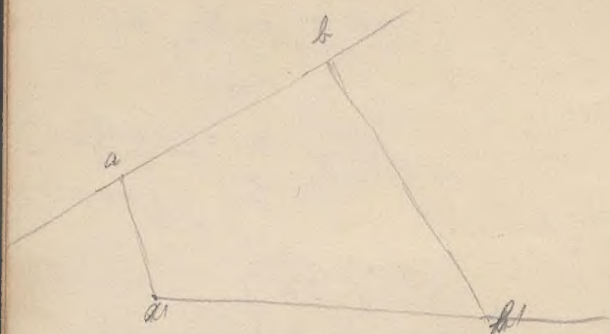
$$PM'' \perp Y$$

$$PM''' \perp Z$$



Projektion einer Geraden auf eine andere

Proj.  $\gamma \in \pi$   $\hookrightarrow$   $\gamma \cap \pi = \{ \gamma \}$



$$x = \text{Proj. } a \quad ; \quad x \in \pi$$

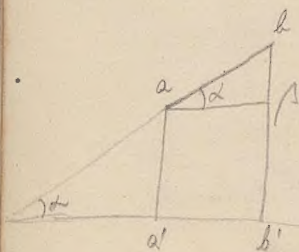
$$y = \text{Proj. } b \quad ; \quad y \in \pi$$

$$z = \text{Proj. } ab \quad ; \quad z \in \pi$$

B.H.

$$\overline{a'b'} = \overline{ab} \cos \alpha$$

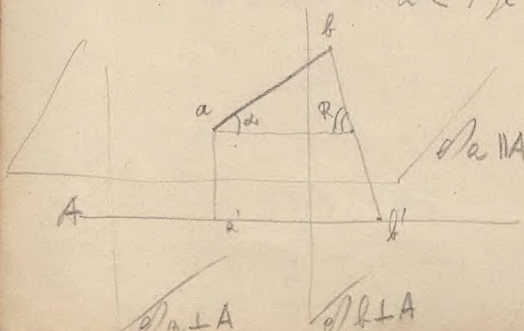
$$\gamma \in \pi \hookrightarrow \gamma \cap \pi = \{ \gamma \}$$



$$a'b' = a\beta = ab \cos \alpha$$

Proj.  $\pi$

$$a \in \pi \cap \pi = \{ a \}$$

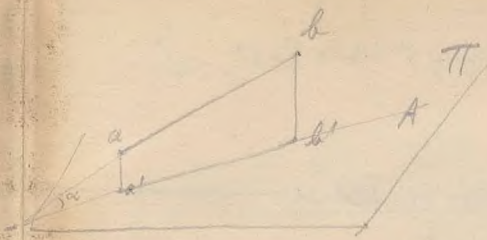


$$a \in \pi \cap \pi = \{ a \}$$

$$a'b' = ab \cos \alpha$$

$$x \in \pi \cap \pi = \{ x \}$$

$$y \in \pi \cap \pi = \{ y \}$$



Let  $M = 2\pi$  proj.  
 $\text{proj. } ab = ab \cos \alpha$

$$\left. \begin{aligned} \angle XOP &= \alpha \\ \angle YOP &= \beta \\ \angle ZOP &= \gamma \end{aligned} \right\} \angle \text{between } \vec{r} \text{ and } \vec{r}'$$

$$\begin{aligned} x &= r \cos \alpha \\ y &= r \cos \beta \\ z &= r \cos \gamma \end{aligned}$$

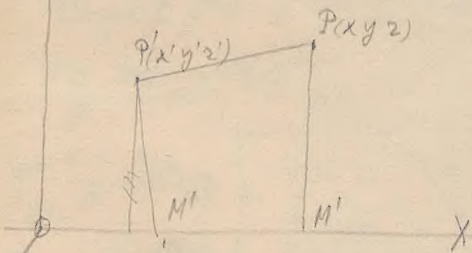
$$r^2 = OM'^2 + M'P^2 = OM'^2 + P''P^2 + M'P''^2$$

$$= OM'^2 + OM''^2 + OM''^2$$

$$r^2 = x^2 + y^2 + z^2$$

$$r^2 = r'^2 [\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma]$$

$$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$$



$$\overline{P'P} = e$$

$$PM' \perp X$$

$$PM'_1 \perp X$$

$$OM' = x$$

$$OM'_1 = x'$$

$$\overline{M'_1 M'} = x - x'$$

$$= \text{Proj. } P'P$$

$$x - x' = \text{Proj. } e \text{ along } X$$

$$y - y' = \text{Proj. } e \text{ along } Y$$

$$z - z' = \text{Proj. } e \text{ along } Z$$

$$\alpha, \beta, \gamma = \angle \text{between } \vec{r} \text{ and } \vec{r}'$$



$$x-x' = e \cos \alpha$$

$$y-y' = e \cos \beta$$

$$z-z' = e \cos \gamma$$

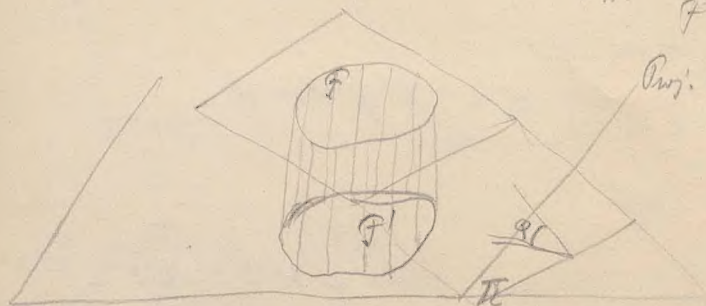
$$(x-x')^2 + (y-y')^2 + (z-z')^2 = e^2$$

Projektion von Flächen

$$e x' = z' \text{ s.p. Proj. } e / y = z$$

$$BH: F' = F \cos \varphi$$

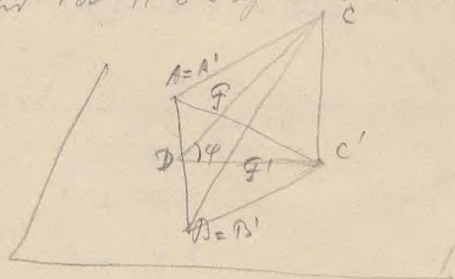
$$\text{Proj. } F = F \cos \varphi$$



ist  $\alpha = \varphi$   $z' = z \cos \varphi$   $e \cos \gamma = e \cos \varphi$

s.p.  $e \cos \gamma = e \cos \varphi$   $z' = z \cos \varphi$

weil  $P \in \Pi$   $z' = z \cos \varphi$   $e \cos \gamma = e \cos \varphi$



$$CD \perp AB$$

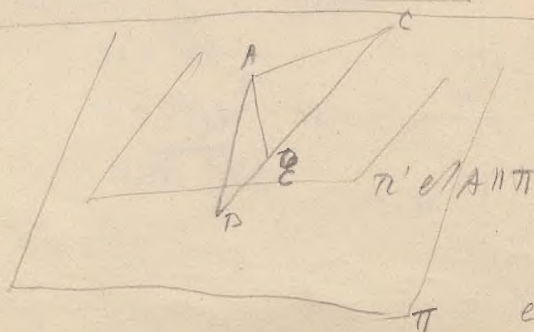
$$C'D \perp A'B$$

$$F = \frac{AB \cdot CD}{2}$$

$$F' = \frac{A'B' \cdot C'D}{2}$$

$$= \frac{AB \cdot CD \cos \varphi}{2}$$

$$= F \cos \varphi$$



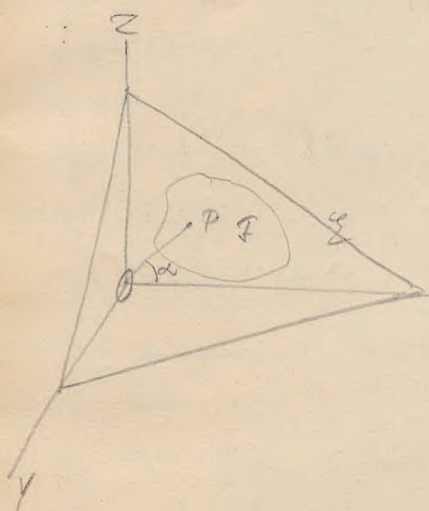
$$\cos \varphi = \frac{z'}{z}$$

$$e \cos \gamma = e \cos \varphi$$





Perpendicular to the surface  
 of the body.



Perpendicular to the surface.

Perpendicular to the surface.

$$OP \perp \text{plane } XYZ$$

$$\angle \alpha = \angle \text{between } OP \text{ and } Z\text{-axis}$$

$$\angle \beta = \angle \text{between } OP \text{ and } X\text{-axis}$$

$$\angle \gamma = \angle \text{between } OP \text{ and } Y\text{-axis}$$

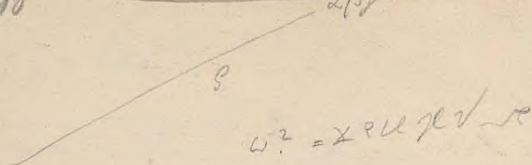
Direction cosines of the force vector

$$F_x, F_y, F_z$$

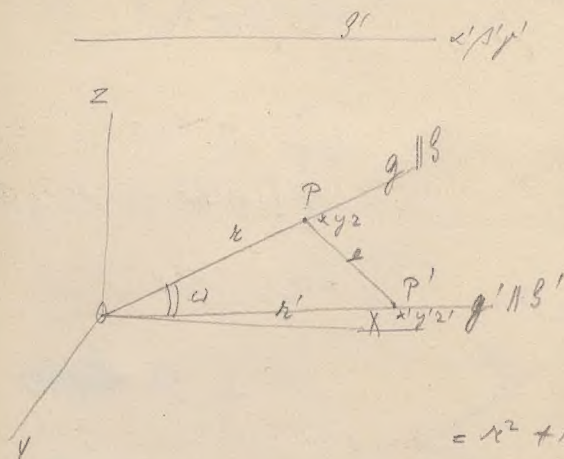
$$\left. \begin{aligned} F_z &= F \cos \alpha \\ F_x &= F \cos \beta \\ F_y &= F \cos \gamma \end{aligned} \right\} (F_z)^2 + (F_x)^2 + (F_y)^2 = F^2$$

19/10

(Winkel zweier Geraden)

 $\alpha/\beta$ 

$$\omega^2 = x^2 + y^2 + z^2$$



$$r^2 = r^2 + r'^2 - 2rr'\cos\omega$$

$$= (x-x')^2 + (y-y')^2$$

$$+ (z-z')^2$$

$$= x^2 + y^2 + z^2 - 2xx' - 2yy'$$

$$- 2zz' + x'^2 + y'^2 + z'^2$$

$$= r^2 + r'^2 - 2(xx' + yy' + zz')$$

$$rr'\cos\omega = xx' + yy' + zz'$$

$$\cos\omega = \cos\alpha\cos\alpha' + \cos\beta\cos\beta' + \cos\gamma\cos\gamma'$$

$x = r\cos\alpha$	$x' = r'\cos\alpha'$
$y = r\cos\beta$	$y' = r'\cos\beta'$
$z = r\cos\gamma$	$z' = r'\cos\gamma'$

$$2r\cos\omega = r + r' = 1 \text{ m.}$$

m. l.

$$B' \perp B \quad \cos\alpha\cos\alpha' + \cos\beta\cos\beta' + \cos\gamma\cos\gamma' = 0$$

$$\cos\omega = \cos\alpha\cos\alpha' + \cos\beta\cos\beta' + \cos\gamma\cos\gamma'$$

$$\sin^2\omega = 1 - [\cos\alpha\cos\alpha' + \cos\beta\cos\beta' + \cos\gamma\cos\gamma']^2$$

$$= [\cos^2\alpha + \cos^2\beta + \cos^2\gamma] [\cos^2\alpha' + \cos^2\beta' + \cos^2\gamma'] -$$

$$- [\cos\alpha\cos\beta + \cos\beta\cos\beta' + \cos\gamma\cos\gamma']^2$$

$$= [\cos\alpha\cos\beta' - \cos\beta\cos\alpha']^2 + [\cos\beta\cos\gamma' - \cos\gamma\cos\beta']^2 +$$



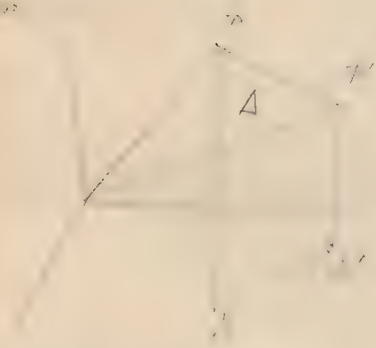
$\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$   
 $\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$



$$\begin{aligned}
 I &= \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx \\
 &= \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx \\
 &= \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx
 \end{aligned}$$

$\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$   
 $\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$

$$\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$$



$$\Delta = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$$

$$\Delta = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$$

$\Delta = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$

$\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$   
 $\frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{2} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$

$$\Delta^2 = \frac{1}{4} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx = \frac{1}{4} \int_{-1}^1 \frac{1}{\sqrt{1-x^2}} dx$$





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$$f'' = \dots$$

$$f' = \dots$$

$$f = \dots$$

$$T = \dots$$

$$T = \dots$$

$$f'' = \dots$$

+

$$= 10.1 - 1.74 + \dots + 2.3(x_1 - \dots)$$

$$= \begin{vmatrix} x_1 & x_2 & x_3 \\ 1 & 1 & 1 \\ \dots & \dots & \dots \end{vmatrix}$$

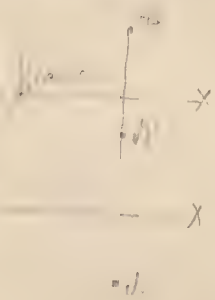
$$\frac{f'(x_1) + \dots + f'(x_n)}{n} = \frac{f'(x_1) + \dots + f'(x_n)}{1 - \dots}$$

$$1 - \dots$$

$$z = 2$$

$$x = \dots$$

$$\dots$$



4

6



$\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$   
 $\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$   
 $\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$

$\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$   
 $\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$   
 $\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$

$$f(t) = \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$$

$$\begin{aligned}
 &= \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right) + \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right) + \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right) \\
 &+ \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right) + \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right) + \frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)
 \end{aligned}$$

$$\begin{vmatrix}
 1 & 0 & 0 & 0 \\
 0 & 1 & 0 & 0 \\
 0 & 0 & 1 & 0 \\
 0 & 0 & 0 & 1
 \end{vmatrix}$$

$\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$   
 $\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$   
 $\frac{1}{2} \frac{d}{dt} \left( \frac{1}{2} \frac{d^2}{dt^2} \right)$

$$6\delta = 0, \quad \delta = 0$$

$$\Delta = 6$$



2. The line  $AC$  is parallel to  $BD$  and  $AD$  is parallel to  $BC$ .

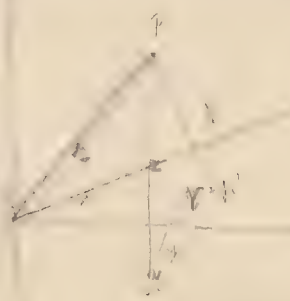
3.  $\angle A = \angle C$  and  $\angle B = \angle D$  (opposite angles are equal).

4.  $AC = BD$  (diagonals are equal).

5. The area of the parallelogram is equal to the sum of the areas of the two triangles formed by the diagonals.

6. The diagonals of a parallelogram bisect each other.

7. The diagonals of a parallelogram are not perpendicular unless it is a rhombus.



Area of  $\triangle ABD = \frac{1}{2} \times BD \times h$

Area of  $\triangle BCD = \frac{1}{2} \times BD \times h$

Area of parallelogram  $ABCD = \text{Area of } \triangle ABD + \text{Area of } \triangle BCD$



$$\begin{cases} \Sigma = \begin{pmatrix} 1 & 12 & 11 \\ 1 & 18 & 14 \\ 1 & 10 & 17 \end{pmatrix} \\ \dots \end{cases}$$

$$\begin{aligned} & \Sigma X' = \dots \\ & \Sigma Y' = \dots \\ & \Sigma Z' = \dots \end{aligned}$$

$$\left. \begin{aligned} \Sigma X' &= x = x' + y' + z' \\ \Sigma Y' &= y = x' + y' + z' \\ \Sigma Z' &= z = x' + y' + z' \end{aligned} \right\}$$

4/6

Let  $x, y, z$  be the coordinates of a point in space.  
 Let  $x', y', z'$  be the coordinates of the same point in a new system.  
 Let  $\alpha, \beta, \gamma$  be the direction cosines of the new axes with respect to the old axes.



Let  $\alpha, \beta, \gamma$  be the direction cosines of the new axes with respect to the old axes.  
 Let  $\alpha', \beta', \gamma'$  be the direction cosines of the old axes with respect to the new axes.  
 Let  $\alpha'', \beta'', \gamma''$  be the direction cosines of the new axes with respect to the new axes.

$$x = x' \cos \alpha + y' \cos \beta + z' \cos \gamma$$

$$y = x' \cos \alpha' + y' \cos \beta' + z' \cos \gamma'$$

$$z = x' \cos \alpha'' + y' \cos \beta'' + z' \cos \gamma''$$

$$x' = x \cos \alpha + y \cos \alpha' + z \cos \alpha''$$

$$y' = x \cos \beta + y \cos \beta' + z \cos \beta''$$

$$z' = x \cos \gamma + y \cos \gamma' + z \cos \gamma''$$

$$x \cos \alpha + y \cos \alpha' + z \cos \alpha'' = x' \cos \alpha + y' \cos \alpha' + z' \cos \alpha''$$

$$+ y' (\cos \alpha' \cos \alpha + \cos \beta' \cos \beta + \cos \gamma' \cos \gamma) = 0$$





1.  $x = 0$   $y = 0$   $z = 0$

2.  $x = 1$   $y = 0$   $z = 0$

3.  $x = 0$   $y = 1$   $z = 0$

4.  $x = 0$   $y = 0$   $z = 1$

5.  $x = 1$   $y = 1$   $z = 0$

6.  $x = 0$   $y = 1$   $z = 1$

7.  $x = 1$   $y = 0$   $z = 1$

8.  $x = 1$   $y = 1$   $z = 1$

9.  $x = 0$   $y = 0$   $z = 0$

10.  $x = 1$   $y = 0$   $z = 0$

11.  $x = 0$   $y = 1$   $z = 0$

12.  $x = 0$   $y = 0$   $z = 1$

13.  $x = 1$   $y = 1$   $z = 0$

14.  $x = 0$   $y = 1$   $z = 1$

15.  $x = 1$   $y = 0$   $z = 1$

16.  $x = 1$   $y = 1$   $z = 1$

17.  $x = 0$   $y = 0$   $z = 0$



$$1.5 \pm 0.1$$

$$1.5 \pm 0.1$$

$$1.5 \pm 0.1$$

$$1.5 \pm 0.1$$

$$ax + by + cz = \frac{1}{2} \frac{a^2 + b^2 + c^2}{2}$$

$$x^2 + y^2 + z^2 = \frac{1}{2} \frac{a^2 + b^2 + c^2}{2}$$

$$00' = 2' p$$

$$a = 1.5 \pm 0.1$$

$$b = 1.5 \pm 0.1$$

$$c = 1.5 \pm 0.1$$

$$2.15 \pm 0.1 = 4.1$$

$$2p \cos \alpha + 4p \cos \beta + 4p \cos \gamma = \frac{2}{3}$$

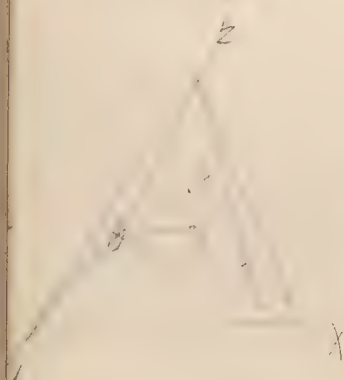
$$x \cos \alpha + y \cos \beta + z \cos \gamma = \frac{1}{3}$$

1. The first step is to find the normal force.

2. The second step is to find the friction force.

3. The third step is to find the tension force.

4. The fourth step is to find the weight force.



1. The first step is to find the normal force.

2. The second step is to find the friction force.

3. The third step is to find the tension force.

$\Sigma$

$\mu = \tan \theta$

$\mu = \tan \theta = \frac{\text{opposite}}{\text{adjacent}}$

4. The fourth step is to find the weight force.

5. The fifth step is to find the tension force.



6. The sixth step is to find the weight force.

7. The seventh step is to find the tension force.

$$\frac{x}{y} = \frac{a}{b} + \frac{c}{d} = 1$$

$$\frac{x}{y} = \frac{a}{b} + \frac{c}{d} = 1$$



1.  $\frac{1}{x^2} = x^{-2}$

$$\frac{d}{dx} x^{-2} = -2x^{-3}$$

$$= -\frac{2}{x^3}$$

2.  $\frac{1}{x^3} = x^{-3}$

$$\frac{d}{dx} x^{-3} = -3x^{-4}$$

$$= -\frac{3}{x^4}$$

$$= -\frac{3}{x^4}$$

$$= -\frac{3}{x^4}$$

3.  $\frac{1}{x^4} = x^{-4}$

$$\frac{d}{dx} x^{-4} = -4x^{-5}$$

$$= -\frac{4}{x^5}$$

4.  $\frac{1}{x^5} = x^{-5}$

$$\frac{d}{dx} x^{-5} = -5x^{-6}$$

$$= -\frac{5}{x^6}$$

5.  $\frac{1}{x^6} = x^{-6}$

$$\frac{d}{dx} x^{-6} = -6x^{-7}$$

$$= -\frac{6}{x^7}$$

6.  $\frac{1}{x^7} = x^{-7}$

$$\frac{d}{dx} x^{-7} = -7x^{-8}$$

$$= -\frac{7}{x^8}$$

$$u = \frac{1}{\sqrt{1-\beta^2}}$$

$$u = \frac{1}{\sqrt{1-\beta^2}}$$

$$u = \frac{1}{\sqrt{1-\beta^2}}$$

$$u = \frac{1}{\sqrt{1-\beta^2}}$$

2. ...

... ..

$$A_1 + B_1 = C_1$$

$$A_2 + B_2 = C_2$$

$$A_3 + B_3 = C_3$$

... ..

$$A_1 + B_1 + C_1 = 0$$

$$A_2 + B_2 + C_2 = 0$$

$$B_1 = C_1$$

$$m = 0$$

$$L/R$$

$$A_1 + C_1 = 0$$

$$A_2 + C_2 = 0$$

$$D: A_1 + B_1 + C_1 = 0$$

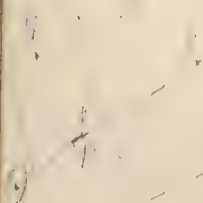




$$P_1 = 1.0$$

$$M_1 = 1.0 \text{ (assumed)} \quad \text{at } x=0$$

$$M_2 =$$



$$P_2 = P_1 - w \cdot x$$

$$M_2 = M_1 - P_1 \cdot x + \frac{w \cdot x^2}{2}$$

$$P_1 = 1.0$$

$$M_1 = 1.0$$

$$x = 1.0$$

$$P_2 = 1.0 - 1.0 \cdot 1.0 = 0$$

$$M_2 = 1.0 - 1.0 \cdot 1.0 + \frac{1.0 \cdot 1.0^2}{2} = 0.5$$

$$P_2 = 0$$

$$M_2 = 0.5$$

$$= [1.0 - 1.0 \cdot 1.0 + \frac{1.0 \cdot 1.0^2}{2}]$$

$$P_2 = 0 \quad \text{at } x=1.0$$

$$M_2 = 0.5$$

$$K F_1 =$$

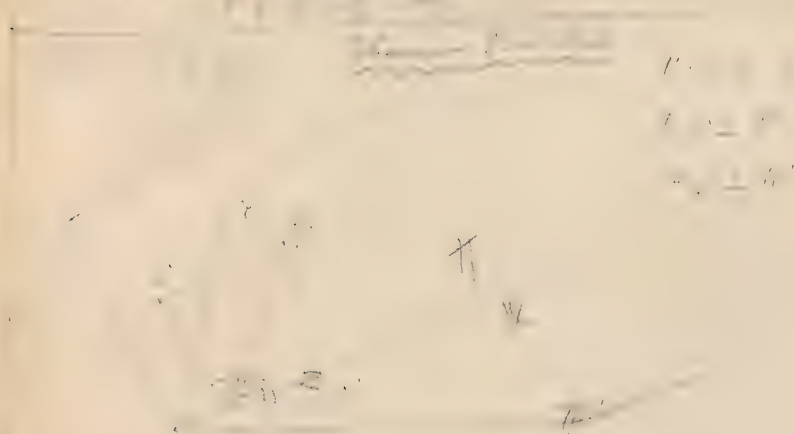
$$L = 1.0$$

$$\lambda = \frac{P_1}{K F_1}$$

$$\frac{A_1 \cdot J_1 + C_1 \cdot \lambda}{\lambda \cdot A_1 \cdot J_1}$$

$$P \cdot V = \frac{N k_B T}{\pi}$$

4



$$P \cdot V = \frac{N k_B T}{\pi}$$

$$P \cdot V = \frac{N k_B T}{\pi}$$

$$P \cdot V = \frac{N k_B T}{\pi}$$

$$P \cdot V = \frac{N k_B T}{\pi}$$

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$$P \cdot V = \frac{N k_B T}{\pi}$$

$$P \cdot V = \frac{N k_B T}{\pi}$$

$$P \cdot V = \frac{N k_B T}{\pi}$$

Let  $\pi = \pi_1 \pi_2 \dots \pi_k$  be a factorization of  $\pi$  into prime factors.

Let  $\pi_i$  be a prime factor of  $\pi$ . Then  $\pi_i$  divides  $\pi$  and  $\pi_i$  is a prime.

Let  $\pi_i$  be a prime factor of  $\pi$ . Then  $\pi_i$  divides  $\pi$  and  $\pi_i$  is a prime.

Let  $\pi_i$  be a prime factor of  $\pi$ . Then  $\pi_i$  divides  $\pi$  and  $\pi_i$  is a prime.

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Let  $\pi_i$  be a prime factor of  $\pi$ . Then  $\pi_i$  divides  $\pi$  and  $\pi_i$  is a prime.







1. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the structure of the atom is determined by the laws of quantum mechanics.

2. The second part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the structure of the atom is determined by the laws of quantum mechanics.

3. The third part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the structure of the atom is determined by the laws of quantum mechanics.

4. The fourth part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the structure of the atom is determined by the laws of quantum mechanics.

5. The fifth part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the structure of the atom is determined by the laws of quantum mechanics.

6. The sixth part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom. It is shown that the structure of the atom is determined by the laws of quantum mechanics, and that the structure of the atom is determined by the laws of quantum mechanics.

$\frac{1}{n}$  ...  
 $m$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$\frac{1}{n}$  ...

$F_1 = 1$	1	$m$
$F_2 = 0$		$n$
$F_3 = 0$		1
$F_4 = 0$		1

$\frac{1}{n}$  ...



1870

1871

1872

1873

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1878

1879

1880

1881

1882

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1884

2.

4. W. L. 1911

$$1. \quad \text{The first part of the proof is the same as in the previous case.} \quad \square$$
$$d_m B_1 = \frac{1}{2} (B_1 + B_2) = J$$

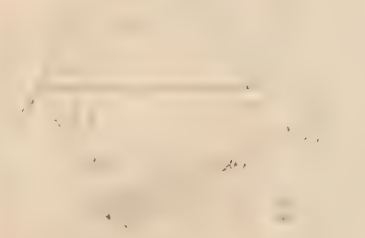
*[Faint handwritten notes at the bottom of the page]*

1891

$$m_A \tau_{A-} = m_B \tau_{B+} = m_C \tau_{C+} = m_D \tau_{D+} = m_E \tau_{E+}$$
$$m, \beta_1 = 0, \beta_2 = 0, \beta_3 = 0$$

*m*, *n*, *p*, *q*, *r*, *s*, *t*, *u*, *v*, *w*, *x*, *y*, *z*.

(vii) The number of points in the intersection of two distinct lines is at most one.



$$\begin{aligned} \vec{r}_1 &= \vec{r}_1 = \vec{r}_1 & = u_1 \\ \vec{r}_2 &\perp \vec{r}_1 & = u_2 \\ \vec{r}_3 &= \vec{r}_3 & = u_3 \end{aligned}$$

$$u_1 = \dots \quad \sqrt{\dots} = \dots$$

$$\frac{f_1}{f_2} = \dots$$

$$u_1 = - \frac{\vec{r}_1}{A \cdot \dots} = \dots$$

$$u_2 = \dots$$

$$\begin{aligned} u_1 &= \dots \\ u_2 &= \dots \\ u_3 &= \dots \end{aligned}$$

$$\frac{m}{L} = \frac{m}{L} = \dots$$

$$m = \dots$$

$$\dots = \dots <$$

... ..  
 ... ..  
 ... ..  
 [ ... ]

2. 6. 11. 12. 13.

1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1

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1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1

1/2 (a + b) = 1/2 (1 + 1) = 1



20X  
XZ  
XZ  
XZ



~~Let  $f(x) = \frac{1}{x^2}$~~   
 ~~$f'(x) = -\frac{2}{x^3}$~~

~~$f(1) = 1$~~   
 ~~$f'(1) = -2$~~

~~$f(2) = \frac{1}{4}$~~   
 ~~$f'(2) = -\frac{1}{2}$~~

~~$f(3) = \frac{1}{9}$~~   
 ~~$f'(3) = -\frac{2}{27}$~~

~~$f(4) = \frac{1}{16}$~~   
 ~~$f'(4) = -\frac{1}{8}$~~

~~$f(5) = \frac{1}{25}$~~   
 ~~$f'(5) = -\frac{2}{125}$~~

~~$f(6) = \frac{1}{36}$~~   
 ~~$f'(6) = -\frac{1}{18}$~~

Let  $f(x) = \frac{1}{x^2}$

Find the value of  $f'(x)$  at  $x=1$

$f'(1) = -2$

$\frac{f'(1)}{f(1)} = \frac{-2}{1} = -2$

$\frac{f'(2)}{f(2)} = \frac{-\frac{1}{2}}{\frac{1}{4}} = -2$

1.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 2.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 3.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 4.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 5.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$

$$D = \frac{1}{2} \frac{d}{dt} (x^2 + y^2)$$

2

6.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 7.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 8.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 9.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$

10.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 11.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 12.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 13.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 14.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$

15.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 16.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 17.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 18.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 19.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$   
 20.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$



1.  $\frac{1}{x^2} = x^{-2}$

2.  $\frac{1}{x^3} = x^{-3}$

3.  $\frac{1}{x^4} = x^{-4}$

$$\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$$

$$\frac{d}{dx} x^{-3} = -3x^{-4} = -\frac{3}{x^4}$$

$$\frac{d}{dx} x^{-4} = -4x^{-5} = -\frac{4}{x^5}$$

4.

5.

$$\frac{d}{dx} x^{-5} = -5x^{-6} = -\frac{5}{x^6}$$

$$\frac{d}{dx} x^{-6} = -6x^{-7} = -\frac{6}{x^7}$$

$$\frac{d}{dx} x^{-7} = -7x^{-8} = -\frac{7}{x^8}$$

$$\frac{d}{dx} x^{-8} = -8x^{-9} = -\frac{8}{x^9}$$

$$\frac{d}{dx} x^{-9} = -9x^{-10} = -\frac{9}{x^{10}}$$

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2012

10.10.12

10.10.12

10.10.12

$$x = \frac{1}{1-t}$$

$$y = \frac{1}{1-t}$$

$$z = \frac{1}{1-t}$$

10.10.12

$$x = \frac{1}{1-t}$$

$$y = \frac{1}{1-t}$$

$$z = \frac{1}{1-t}$$



10.10.12

10.10.12

10.10.12

$$x = -\frac{1}{2}$$

$$x = \frac{1}{1-t}$$

$$x = \frac{1}{1-t} - \frac{1}{2} x_1$$

$$x_1 + x_2 + x_3$$



$$x_1 = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$x_2 = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$x_3 = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

$$x_4 = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$



1. (1) (2) (3)

$$1 - \frac{1}{a} \quad 1 - \frac{1}{b}$$

2. (1) (2) (3)

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

3. (1) (2) (3)

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

$$\frac{1}{a} - \frac{1}{b} = \frac{b-a}{ab}$$

17

*[Faint handwritten notes]*

$$A(x, y) = \int_0^x \int_0^y f(t, s) dt ds$$

A. 1. 1. 1. 1. 1.

$A + B = 1$

∴  $6! \cdot 6! \cdot 75 \cdot 10^6 = 10^{12}$ .

*B. ...*

$$x \cdot x' + y \cdot y' + z \cdot z' = 0 \quad \text{if } x^2 + y^2 + z^2 = 0$$

$\frac{1}{\sqrt{\pi}} \int_{-\infty}^{\infty} f(x) e^{-x^2} dx = \frac{1}{\sqrt{\pi}}$

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1.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

$$d_1(t) = \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 = d_2(t) = \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2$$

$$\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$$

2.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

3.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

4.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

5.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

$$A(x, y) = 0 + Cx = 0$$

$$\lambda = \frac{A_0 - B}{A_0 - C}$$

$$\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$$

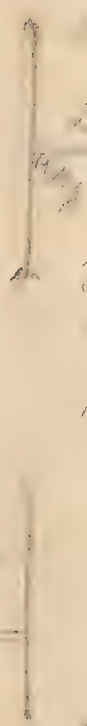
6.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

7.  $\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$

$$\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$$

$$\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$$

$$\frac{d}{dt} \left( \frac{1}{2} m \dot{x}^2 + \frac{1}{2} m \dot{y}^2 \right) = \frac{d}{dt} (m \dot{x} \dot{x} + m \dot{y} \dot{y})$$



The following is a list of the  
 names of the persons who  
 have been admitted to the  
 membership of the Society since  
 the last meeting.

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

$$x = \frac{3 - \sqrt{5}}{4 + \sqrt{5}}$$

$$y = \frac{1}{2} \sqrt{5}$$

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

Mr. J. H. [Name] [Address]

1.  $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$   
 $A^{-1} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

2.  $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$   $B = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

$$\frac{d}{dt} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix}$$

3.  $y = 1 + \sin x$   
 $y' = \cos x$

4.  $y = \sin x$

$$y = \sin x \Rightarrow y' = \cos x$$

$$y = \cos x \Rightarrow y' = -\sin x$$

$$\frac{d}{dx} \sin x = \cos x$$

$$\int \cos x \, dx = \sin x + C$$

5.  $y = \sin x$

$$y' = \cos x$$

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$\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$   
 $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$   
 $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$

$\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$   
 $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$

$\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$   
 $\vec{r} = x\vec{i} + y\vec{j} + z\vec{k}$

$$Q_1 = (x - x_1) \cos \theta + (y - y_1) \sin \theta$$

$$Q_2 = (x - x_1) \sin \theta + (y - y_1) \cos \theta$$

$$p_1 = x_1 \cos \theta + y_1 \sin \theta$$

$$p_2 = x_1 \sin \theta - y_1 \cos \theta$$

$$k = (x - x_1) \cos \theta + (y - y_1) \sin \theta$$

$$k = (x - x_1) [\cos \theta \sin \theta + \sin \theta \cos \theta] +$$

$$+ (y - y_1) [\cos \theta \cos \theta - \sin \theta \sin \theta]$$

$$+ (z - z_1) [\cos \theta \sin \theta - \sin \theta \cos \theta]$$

$$\left\{ \frac{1}{\sqrt{2}} (\cos \theta \sin \theta - \sin \theta \cos \theta) + \frac{1}{\sqrt{2}} (\cos \theta \cos \theta - \sin \theta \sin \theta) \right\}$$

$\omega = \frac{1}{\sqrt{2}}$   
 $\omega = \frac{1}{\sqrt{2}}$





1.  $\pi_1 \rightarrow$

2.  $\pi_2 \rightarrow$

3.  $k \rightarrow \tau \rightarrow \sigma \rightarrow$

1.1

4.  $\sigma \rightarrow$

5.  $\tau \rightarrow$

6.  $k \rightarrow \tau \rightarrow \sigma \rightarrow$

7.  $\sigma \rightarrow \tau \rightarrow k \rightarrow$

1.2

$\sigma \rightarrow \tau \rightarrow k \rightarrow$

8.  $\tau \rightarrow \sigma \rightarrow k \rightarrow$

9.  $\sigma \rightarrow \tau \rightarrow k \rightarrow$

10.  $k \rightarrow \tau \rightarrow \sigma \rightarrow$

11.  $\tau \rightarrow \sigma \rightarrow k \rightarrow$

12.  $\sigma \rightarrow \tau \rightarrow k \rightarrow$





1

2

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Additional handwritten text at the bottom of the page, including what appears to be a signature or date.

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20.  $\frac{1}{2} \log \frac{1}{2}$

21.  $\frac{1}{2} \log \frac{1}{2}$

22.  $\frac{1}{2} \log \frac{1}{2}$

23.  $\frac{1}{2} \log \frac{1}{2}$

24.  $\frac{1}{2} \log \frac{1}{2}$

25.  $\frac{1}{2} \log \frac{1}{2}$

26.  $\frac{1}{2} \log \frac{1}{2}$

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34.  $\frac{1}{2} \log \frac{1}{2}$

1. The first part of the paper is devoted to a general discussion of the problem.

2. The second part is devoted to a detailed study of the case of a single particle.

3. The third part is devoted to a study of the case of a system of particles.

4. The fourth part is devoted to a study of the case of a system of particles.

5. The fifth part is devoted to a study of the case of a system of particles.

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9. The ninth part is devoted to a study of the case of a system of particles.

10. The tenth part is devoted to a study of the case of a system of particles.

11. The eleventh part is devoted to a study of the case of a system of particles.

12. The twelfth part is devoted to a study of the case of a system of particles.

13. The thirteenth part is devoted to a study of the case of a system of particles.

P. 1. The first part of the paper is devoted to a general discussion of the problem.

P. 2. The second part is devoted to a detailed study of the case of a single particle.

P. 3. The third part is devoted to a study of the case of a system of particles.

P. 4. The fourth part is devoted to a study of the case of a system of particles.

$$10 - \frac{1}{10} = 9.9$$

$$7 - \frac{1}{7} = 6.857$$

$$6 - \frac{1}{6} = 5.833$$

$$p = \frac{6.857 + 5.833}{2} = 6.345$$

$$p = \frac{6.857 + 5.833}{2} = 6.345$$

$$P = 6.345$$

$$P_{10} = \frac{1}{10} \left( \frac{1}{10} + \frac{1}{10} + \dots + \frac{1}{10} \right) = \frac{1}{10}$$

$$t = 10$$

$$P_{10} = \frac{1}{10} \left( \frac{1}{10} + \frac{1}{10} + \dots + \frac{1}{10} \right) = \frac{1}{10}$$

$$P_{10}$$

$$P_{10}$$

$$P_{10} = \frac{1}{10}$$

2. 10. 11. 1926

1. 1. 1926 - 1. 1. 1927

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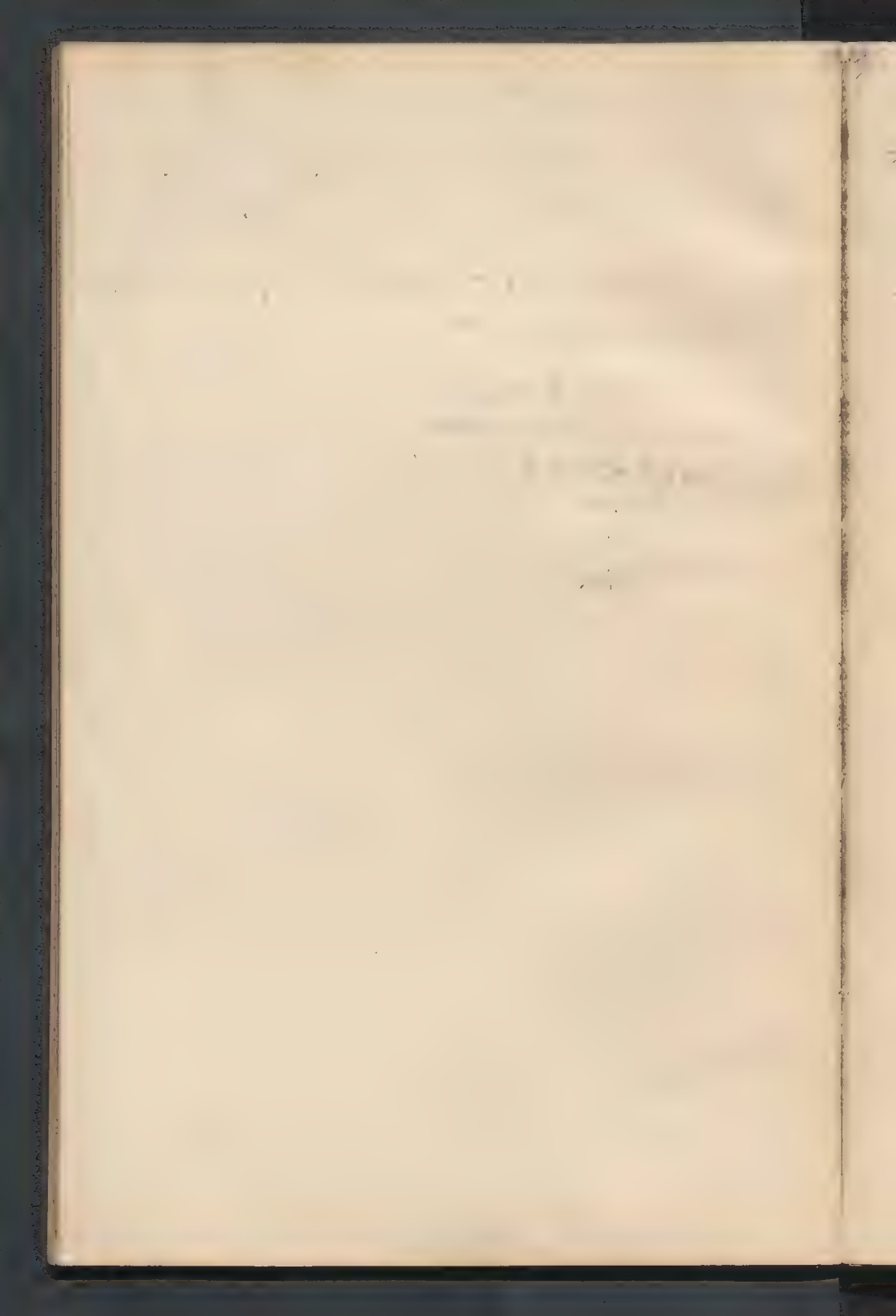
1. 1. 1935 - 1. 1. 1936

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Find the value of  $\lambda$  such that the system of equations

$$\begin{cases} x + y + z = 1 \\ x + \lambda y + z = 2 \\ x + y + \lambda z = 3 \end{cases}$$

$$P_1 = \begin{pmatrix} 1 & 1 & 1 \\ 1 & \lambda & 1 \\ 1 & 1 & \lambda \end{pmatrix}$$

$$P_1^{-1}$$

$$P_1^{-1} = \frac{1}{\Delta} \begin{pmatrix} \lambda - 1 & 1 - \lambda & 0 \\ 1 - \lambda & \lambda - 1 & 0 \\ 0 & 0 & \lambda - 1 \end{pmatrix}$$

$$P_1^{-1} = \frac{1}{\lambda - 1} \begin{pmatrix} \lambda - 1 & 1 - \lambda & 0 \\ 1 - \lambda & \lambda - 1 & 0 \\ 0 & 0 & \lambda - 1 \end{pmatrix}$$

$$P_1^{-1} = \frac{1}{\lambda - 1} \begin{pmatrix} \lambda - 1 & 1 - \lambda & 0 \\ 1 - \lambda & \lambda - 1 & 0 \\ 0 & 0 & \lambda - 1 \end{pmatrix}$$

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$$P_1^{-1} = \frac{1}{\lambda - 1} \begin{pmatrix} \lambda - 1 & 1 - \lambda & 0 \\ 1 - \lambda & \lambda - 1 & 0 \\ 0 & 0 & \lambda - 1 \end{pmatrix}$$

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$$f(x) = \frac{1}{x^2} = x^{-2}$$

$$f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

$$f''(x) = \frac{6}{x^4}$$

$$f'''(x) = -\frac{24}{x^5}$$

$$f^{(4)}(x) = \frac{240}{x^6}$$

$$f^{(5)}(x) = -\frac{2880}{x^7}$$

$$f^{(6)}(x) = \frac{20736}{x^8}$$

$$f^{(7)}(x) = -\frac{268416}{x^9}$$

$$f^{(8)}(x) = \frac{2311680}{x^{10}}$$

$$f^{(9)}(x) = -\frac{23116800}{x^{11}}$$

$$f^{(10)}(x) = \frac{231168000}{x^{12}}$$

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$$\begin{aligned} \Delta_{11} &= \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix} = 1 \\ \Delta_{12} &= \begin{vmatrix} 1 & 0 \\ 0 & 0 \end{vmatrix} = 0 \\ \Delta_{13} &= \begin{vmatrix} 1 & 0 \\ 0 & 0 \end{vmatrix} = 0 \\ \Delta_{21} &= \begin{vmatrix} 0 & 1 \\ 1 & 0 \end{vmatrix} = -1 \\ \Delta_{22} &= \begin{vmatrix} 0 & 1 \\ 0 & 1 \end{vmatrix} = 0 \\ \Delta_{23} &= \begin{vmatrix} 0 & 1 \\ 0 & 0 \end{vmatrix} = 0 \\ \Delta_{31} &= \begin{vmatrix} 0 & 0 \\ 1 & 0 \end{vmatrix} = 0 \\ \Delta_{32} &= \begin{vmatrix} 0 & 0 \\ 0 & 1 \end{vmatrix} = 0 \\ \Delta_{33} &= \begin{vmatrix} 0 & 0 \\ 0 & 0 \end{vmatrix} = 0 \end{aligned}$$

$$P(\lambda) = \begin{vmatrix} 1-\lambda & 0 \\ 0 & 1-\lambda \end{vmatrix} = (1-\lambda)^2 = 0$$

$$\begin{aligned} 1-\lambda &= 0 \\ \lambda &= 1 \end{aligned}$$

$$P(\lambda) = \frac{1}{\lambda} + \frac{1}{\lambda} = \frac{2}{\lambda} = 0$$

$$P(\lambda) = \frac{1}{\lambda} + \frac{1}{\lambda} = \frac{2}{\lambda} = 0$$

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$$P(\lambda) = \frac{1}{\lambda} + \frac{1}{\lambda} = \frac{2}{\lambda} = 0$$

1. *Staphylococcus aureus*

1110

2000

*Handwritten:* 0 2 + 2 = 12

69: 70

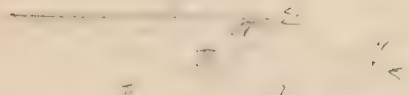
1888

7



*[Faint, illegible handwriting at the top of the page, possibly bleed-through from the reverse side.]*

$$11.77 = \frac{1}{10}$$



I

2

1

1. 1. 1. 1.

1. 1. 1. 1. *sl*  
*m*

*[Faint, illegible handwriting on the right side of the page.]*

$$Q_1 = 0$$

$$Q_2 = 1 \quad \psi_2' = 0$$

$$3. \quad II \quad |A + i\epsilon| = |A + i\epsilon| = \lambda (A + i\epsilon) \quad (1) + (2) \Rightarrow$$

$$A(\psi_1 - \psi_2) + i(\psi_1 - \psi_2) = \lambda(\psi_1 - \psi_2) \\ = \lambda[\psi_1 - \psi_2] = 0 \quad \psi_1 - \psi_2 = 0$$

$$Q_1 = \psi_1 - \psi_2 = \lambda[\psi_1 - \psi_2] = 0$$

$$= \lambda(Q_1 - \lambda Q_2) = 0$$

$$\lambda Q_2 + \lambda Q_1 = 0$$

$$4. \quad IV \quad \psi_1 = 0$$

$$m Q_2 + \lambda Q_1 = 0$$

$$\frac{Q_2}{Q_1} = -\frac{\lambda}{m} = -\frac{11}{m}$$

Handwritten notes at the top of the page, including the word "Theorem" and some mathematical expressions.

Theorem 1

Let  $f(x)$  be a function defined on the interval  $[a, b]$ .

Assume that  $f(x)$  is continuous on  $[a, b]$ .

Then:

$\int_a^b f(x) dx = F(b) - F(a)$

where  $F(x)$  is an antiderivative of  $f(x)$ .

Proof:

Consider:

$\int_a^b f(x) dx = \int_a^x f(x) dx + \int_x^b f(x) dx$

$= F(x) - F(a) + F(b) - F(x)$

$= F(b) - F(a)$

Q.E.D.

Example 1

Find  $\int_0^1 x^2 dx$

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

$$F(x, y, z, \dots)$$

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$$y - 14 = 0$$

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$$-2(x_1) + 2(x_2) + 2(x_3) = 0$$

$$+2(x_1) + 2(x_2) + 2(x_3) = 0$$

$$+2(x_1) + 2(x_2) + 2(x_3) = 0$$

$$+2(x_1) + 2(x_2) + 2(x_3) = 0$$

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$$+2(x_1) + 2(x_2) + 2(x_3) = 0$$

$$+2(x_1) + 2(x_2) + 2(x_3) = 0$$

$$\frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 = 0$$

$$\frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 = 0$$

$$\frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 = 0$$

$$\frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 = 0$$

$$+ \frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 = 0$$

$$\left. \begin{aligned} \frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 &= 0 \\ \frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 &= 0 \\ \frac{d^2}{dt^2} + 2\alpha_1 + 2\alpha_2 + 2\alpha_3 &= 0 \end{aligned} \right\}$$

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1000 / 1000 = 1

$\frac{1}{2}(\sigma_{11} + \sigma_{22}) = \frac{1}{2}(\sigma_{xx} + \sigma_{yy})$   
 $\frac{1}{2}(\sigma_{11} - \sigma_{22}) = \frac{1}{2}(\sigma_{xx} - \sigma_{yy})$   
 $\tau_{12} = \tau_{21} = \tau_{xy}$   
 $\sigma_1 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) + \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$   
 $\sigma_2 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) - \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$

4.

Figure 4.10

$\sigma_1 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) + \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$   
 $\sigma_2 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) - \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$

$$\sigma_1 - \sigma_2 = \sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$$

$$\sigma_1 + \sigma_2 = \sigma_{xx} + \sigma_{yy} = 0$$

$$\sigma_1 = \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$$

$$\sigma_2 = -\frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$$

Figure 4.11

$\sigma_1 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) + \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$   
 $\sigma_2 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) - \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$

Figure 4.12

$$\sigma_1 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) + \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$$

$$\sigma_2 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) - \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$$

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|--|-------------|
| $\sigma_1 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) + \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$ | $\sigma_1$  |
| $\sigma_2 = \frac{1}{2}(\sigma_{xx} + \sigma_{yy}) - \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$ | $\sigma_2$  |
| $\tau_{12} = \frac{1}{2}\sqrt{(\sigma_{xx} - \sigma_{yy})^2 + 4\tau_{xy}^2}$   | $\tau_{12}$ |

2. 10. 1911

1.  $\frac{1}{2} \frac{d}{dt} (x^2 + y^2) = x \dot{x} + y \dot{y}$

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1. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

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19. The first part of the paper is devoted to a discussion of the general principles of the theory of the structure of the atom.

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$$\begin{aligned} f(x,y,z) &= x^2 + y^2 + z^2 \\ \text{subject to } g(x,y,z) &= 10 - 2x - 2y - 2z = 0 \\ \text{Lagrange multiplier } \lambda & \end{aligned}$$

$$F(x,y,z) = f(x,y,z) + \lambda(g(x,y,z))$$

$$= x^2 + y^2 + z^2 + \lambda(10 - 2x - 2y - 2z)$$

$$\frac{\partial F}{\partial x} = 2x - 2\lambda = 0 \quad \frac{\partial F}{\partial y} = 2y - 2\lambda = 0 \quad \frac{\partial F}{\partial z} = 2z - 2\lambda = 0$$

$$\Rightarrow x = \lambda \quad y = \lambda \quad z = \lambda$$

$$\text{Substitute into } g(x,y,z) = 0$$

$$10 - 2x - 2y - 2z = 0$$

$$x = \frac{10}{6} = \frac{5}{3} \quad y = \frac{5}{3} \quad z = \frac{5}{3}$$

Thus:

$$\frac{\partial F}{\partial x} = \frac{\partial F}{\partial y} = \frac{\partial F}{\partial z} = 0$$

at  $(\frac{5}{3}, \frac{5}{3}, \frac{5}{3})$

$$x = \frac{5}{3} \quad y = \frac{5}{3} \quad z = \frac{5}{3} \Rightarrow f(x,y,z) = \frac{25}{3} + \frac{25}{3} + \frac{25}{3} = \frac{75}{3} = 25$$

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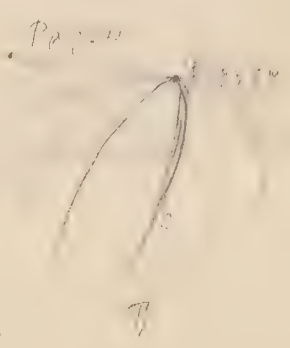
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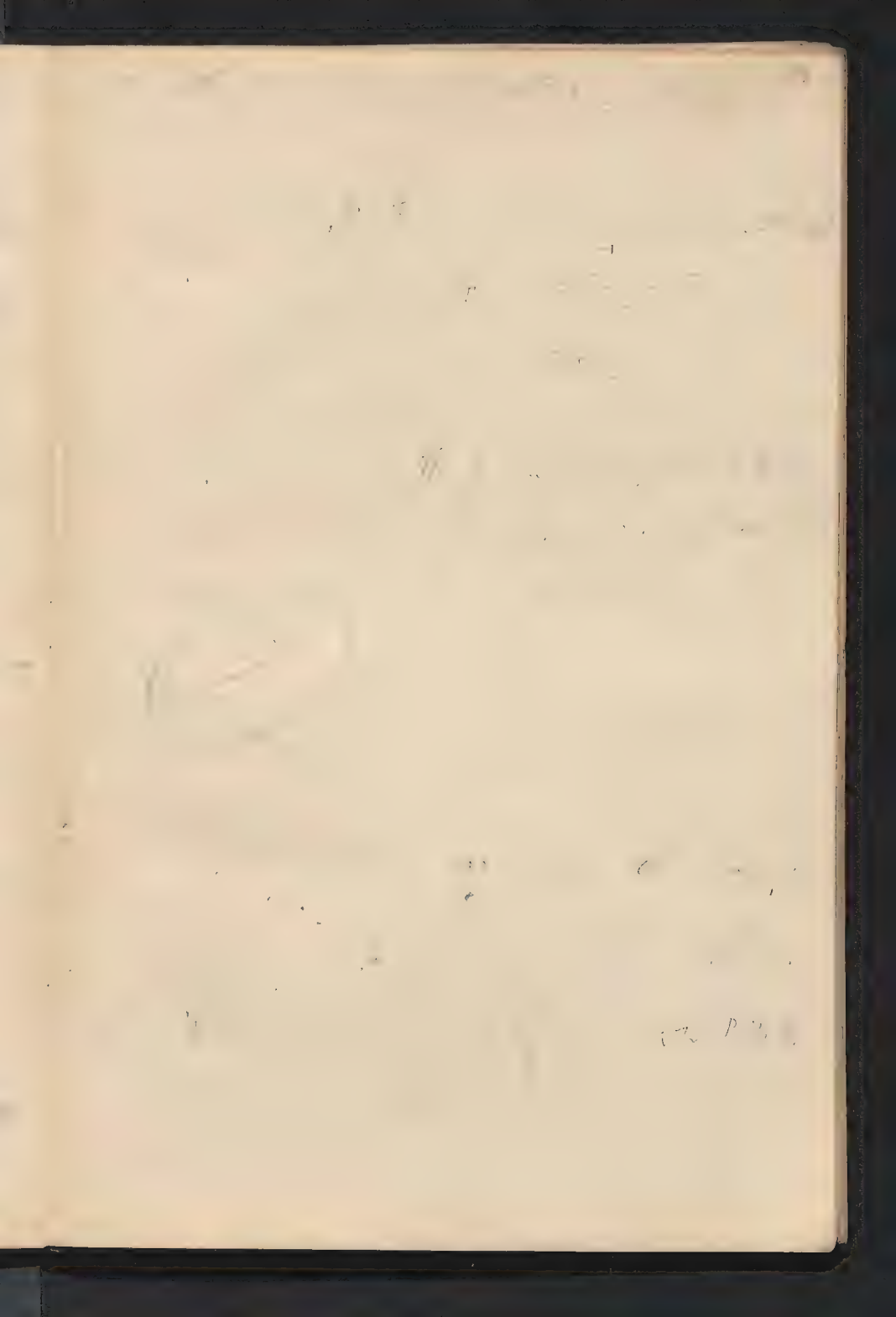
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 of the Board of Directors  
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 The names are as follows:



The names of the persons who  
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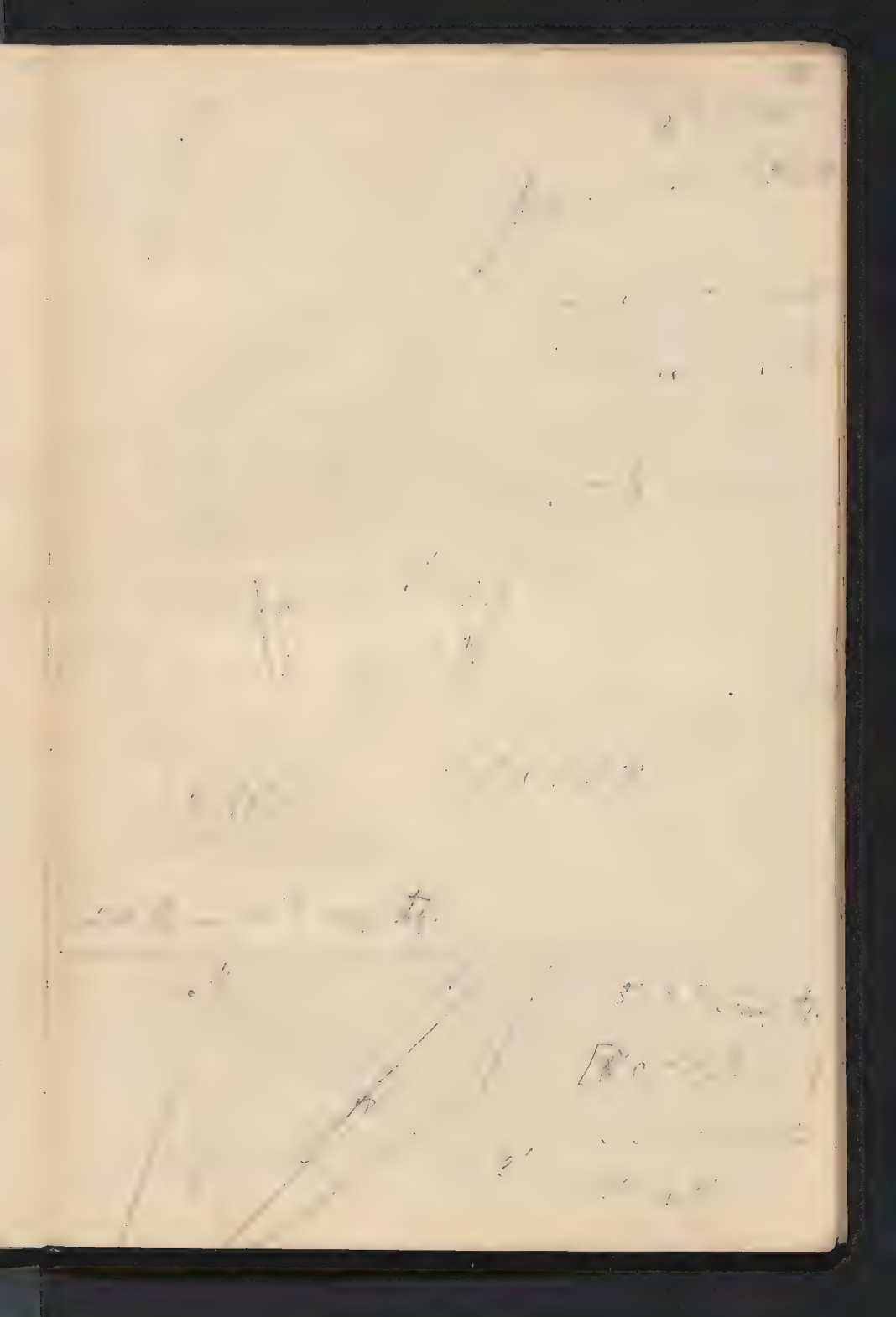


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The first part of the proof is to show that  
 if  $A$  is a symmetric matrix, then  $A$  is diagonalizable.  
 We first show that  $A$  has real eigenvalues.  
 Let  $\lambda$  be an eigenvalue of  $A$  with corresponding eigenvector  $v$ .  
 Then  $Av = \lambda v$ . Taking the inner product of both sides with  $v$ ,  
 we get  $v^T Av = \lambda v^T v$ . Since  $A$  is symmetric,  $v^T Av = (Av)^T v = \lambda v^T v$ .  
 Thus  $\lambda v^T v = \lambda v^T v$ , which implies  $\lambda$  is real.

$$A = \begin{pmatrix} a_{11} & a_{12} & \dots & a_{1n} \\ a_{21} & a_{22} & \dots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \dots & a_{nn} \end{pmatrix} \quad \lambda_1, \lambda_2, \dots, \lambda_n$$

$$I = \begin{pmatrix} \lambda_1 & & \\ & \lambda_2 & \\ & & \ddots \\ & & & \lambda_n \end{pmatrix}$$

$$T = \begin{pmatrix} v_1 & v_2 & \dots & v_n \\ v_1 & v_2 & \dots & v_n \\ v_1 & v_2 & \dots & v_n \\ v_1 & v_2 & \dots & v_n \end{pmatrix}$$



Let  $\mathbf{A} = \begin{pmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{pmatrix}$  and  $\mathbf{B} = \begin{pmatrix} b_{11} & b_{12} & b_{13} \\ b_{21} & b_{22} & b_{23} \\ b_{31} & b_{32} & b_{33} \end{pmatrix}$

$\mathbf{A} + \mathbf{B} = \begin{pmatrix} a_{11}+b_{11} & a_{12}+b_{12} & a_{13}+b_{13} \\ a_{21}+b_{21} & a_{22}+b_{22} & a_{23}+b_{23} \\ a_{31}+b_{31} & a_{32}+b_{32} & a_{33}+b_{33} \end{pmatrix}$

$\mathbf{A} - \mathbf{B} = \begin{pmatrix} a_{11}-b_{11} & a_{12}-b_{12} & a_{13}-b_{13} \\ a_{21}-b_{21} & a_{22}-b_{22} & a_{23}-b_{23} \\ a_{31}-b_{31} & a_{32}-b_{32} & a_{33}-b_{33} \end{pmatrix}$

Let  $\mathbf{C} = \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ c_{21} & c_{22} & c_{23} \\ c_{31} & c_{32} & c_{33} \end{pmatrix}$  and  $\mathbf{D} = \begin{pmatrix} d_{11} & d_{12} & d_{13} \\ d_{21} & d_{22} & d_{23} \\ d_{31} & d_{32} & d_{33} \end{pmatrix}$

Let  $\mathbf{E} = \begin{pmatrix} e_{11} & e_{12} & e_{13} \\ e_{21} & e_{22} & e_{23} \\ e_{31} & e_{32} & e_{33} \end{pmatrix}$  and  $\mathbf{F} = \begin{pmatrix} f_{11} & f_{12} & f_{13} \\ f_{21} & f_{22} & f_{23} \\ f_{31} & f_{32} & f_{33} \end{pmatrix}$

$\mathbf{A} \cdot \mathbf{B} = \begin{pmatrix} a_{11}b_{11} + a_{12}b_{21} + a_{13}b_{31} & a_{11}b_{12} + a_{12}b_{22} + a_{13}b_{32} & a_{11}b_{13} + a_{12}b_{23} + a_{13}b_{33} \\ a_{21}b_{11} + a_{22}b_{21} + a_{23}b_{31} & a_{21}b_{12} + a_{22}b_{22} + a_{23}b_{32} & a_{21}b_{13} + a_{22}b_{23} + a_{23}b_{33} \\ a_{31}b_{11} + a_{32}b_{21} + a_{33}b_{31} & a_{31}b_{12} + a_{32}b_{22} + a_{33}b_{32} & a_{31}b_{13} + a_{32}b_{23} + a_{33}b_{33} \end{pmatrix}$

$\mathbf{B} \cdot \mathbf{A} = \begin{pmatrix} b_{11}a_{11} + b_{12}a_{21} + b_{13}a_{31} & b_{11}a_{12} + b_{12}a_{22} + b_{13}a_{32} & b_{11}a_{13} + b_{12}a_{23} + b_{13}a_{33} \\ b_{21}a_{11} + b_{22}a_{21} + b_{23}a_{31} & b_{21}a_{12} + b_{22}a_{22} + b_{23}a_{32} & b_{21}a_{13} + b_{22}a_{23} + b_{23}a_{33} \\ b_{31}a_{11} + b_{32}a_{21} + b_{33}a_{31} & b_{31}a_{12} + b_{32}a_{22} + b_{33}a_{32} & b_{31}a_{13} + b_{32}a_{23} + b_{33}a_{33} \end{pmatrix}$

Let  $\mathbf{G} = \begin{pmatrix} g_{11} & g_{12} & g_{13} \\ g_{21} & g_{22} & g_{23} \\ g_{31} & g_{32} & g_{33} \end{pmatrix}$  and  $\mathbf{H} = \begin{pmatrix} h_{11} & h_{12} & h_{13} \\ h_{21} & h_{22} & h_{23} \\ h_{31} & h_{32} & h_{33} \end{pmatrix}$

Let  $\mathbf{I} = \begin{pmatrix} i_{11} & i_{12} & i_{13} \\ i_{21} & i_{22} & i_{23} \\ i_{31} & i_{32} & i_{33} \end{pmatrix}$  and  $\mathbf{J} = \begin{pmatrix} j_{11} & j_{12} & j_{13} \\ j_{21} & j_{22} & j_{23} \\ j_{31} & j_{32} & j_{33} \end{pmatrix}$

Let  $\mathbf{K} = \begin{pmatrix} k_{11} & k_{12} & k_{13} \\ k_{21} & k_{22} & k_{23} \\ k_{31} & k_{32} & k_{33} \end{pmatrix}$  and  $\mathbf{L} = \begin{pmatrix} l_{11} & l_{12} & l_{13} \\ l_{21} & l_{22} & l_{23} \\ l_{31} & l_{32} & l_{33} \end{pmatrix}$

Let  $\mathbf{M} = \begin{pmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{pmatrix}$  and  $\mathbf{N} = \begin{pmatrix} n_{11} & n_{12} & n_{13} \\ n_{21} & n_{22} & n_{23} \\ n_{31} & n_{32} & n_{33} \end{pmatrix}$

Let  $\mathbf{O} = \begin{pmatrix} o_{11} & o_{12} & o_{13} \\ o_{21} & o_{22} & o_{23} \\ o_{31} & o_{32} & o_{33} \end{pmatrix}$  and  $\mathbf{P} = \begin{pmatrix} p_{11} & p_{12} & p_{13} \\ p_{21} & p_{22} & p_{23} \\ p_{31} & p_{32} & p_{33} \end{pmatrix}$

Let  $\mathbf{Q} = \begin{pmatrix} q_{11} & q_{12} & q_{13} \\ q_{21} & q_{22} & q_{23} \\ q_{31} & q_{32} & q_{33} \end{pmatrix}$  and  $\mathbf{R} = \begin{pmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{pmatrix}$

$$\begin{vmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{vmatrix} = 0$$

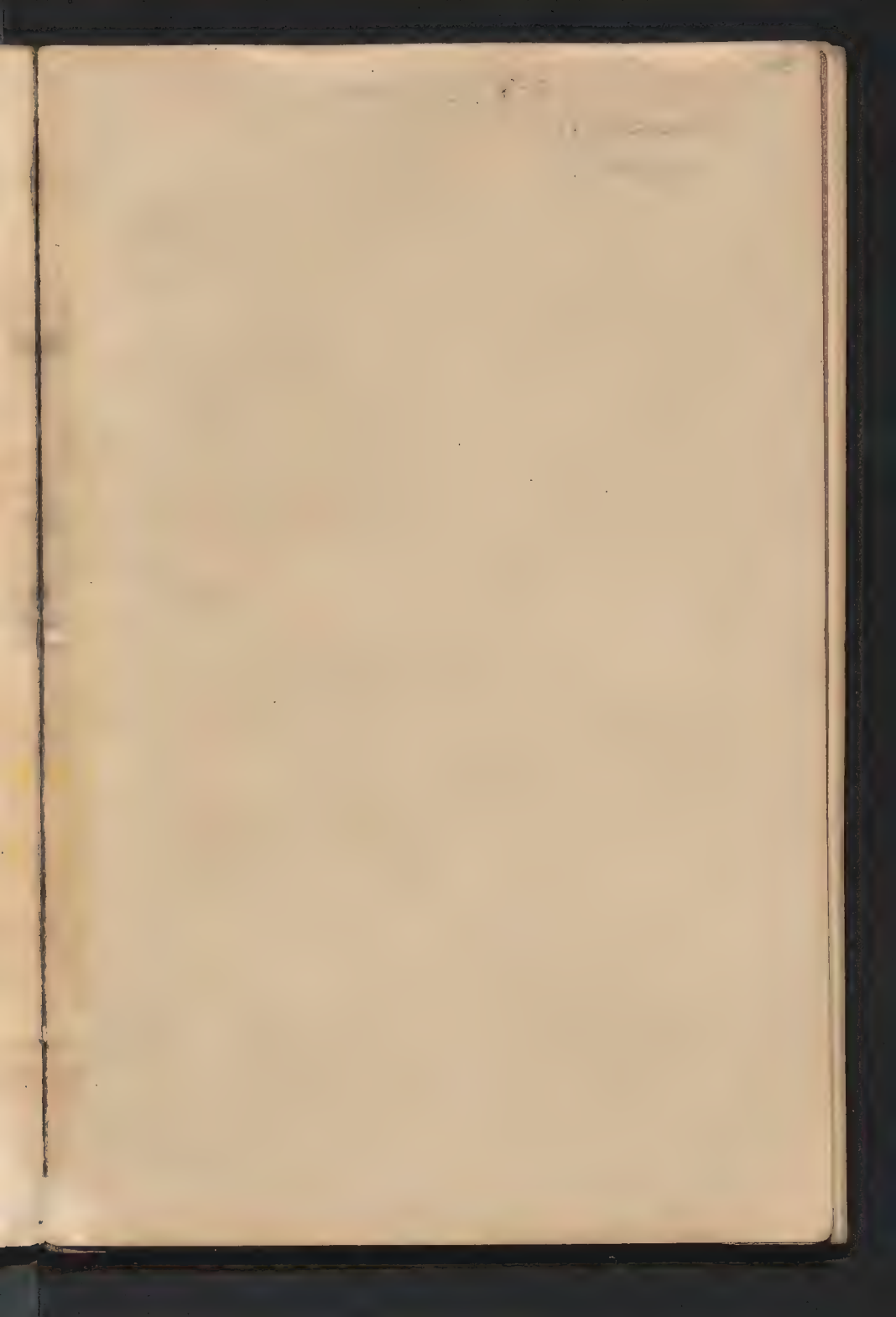
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*[Faint handwritten notes at the bottom of the page]*

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PH. SCHUSTER, PAPIERHANDLUNG

II.

Dr. Emil Weyr

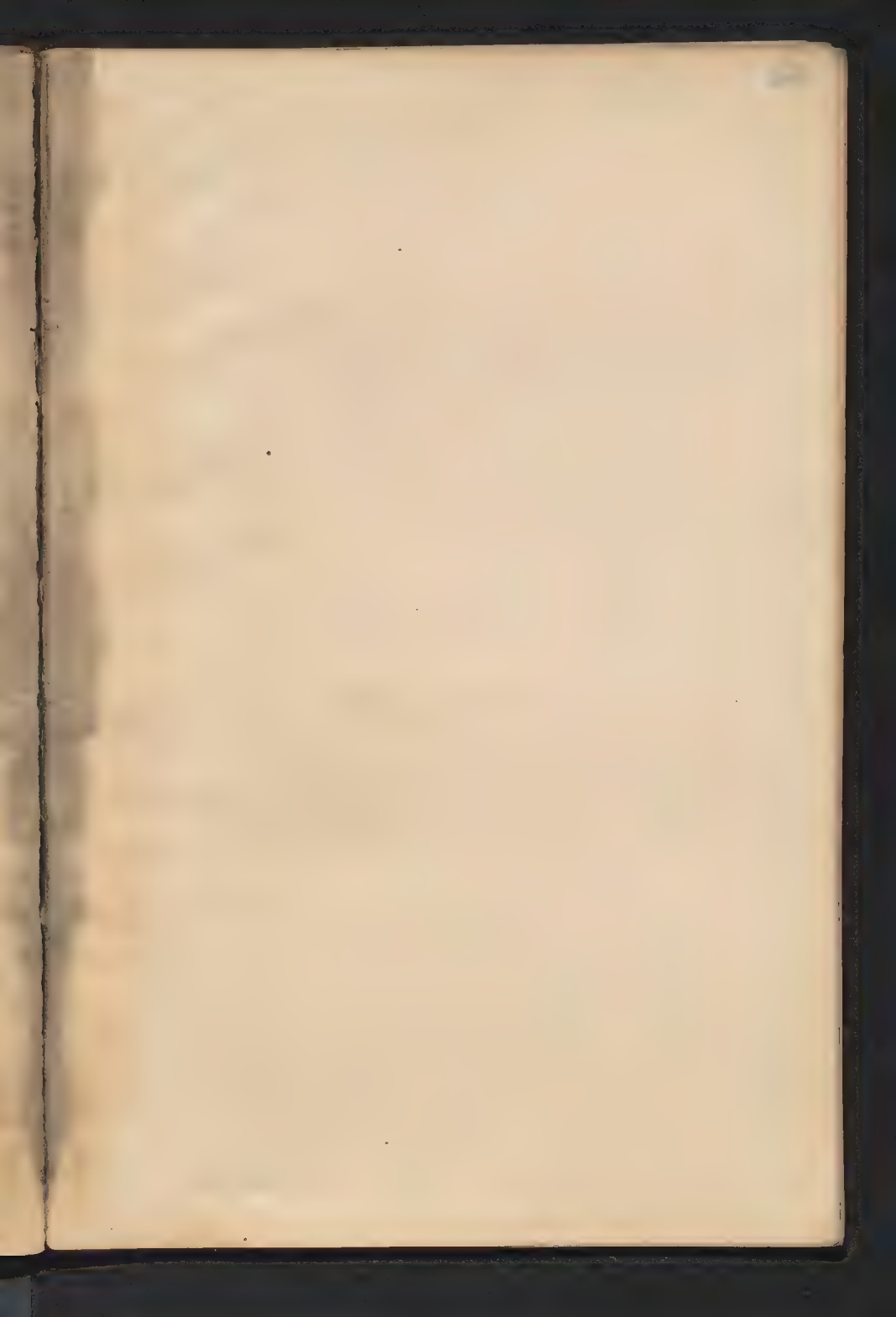
V.S. 1892/93

Analytische Geometrie des  
Raumes

Smoluchowski

Wien, Wieden Hauptstrasse 55.







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$$= 4 \frac{1}{2} \frac{1}{2} \frac{1}{2} \frac{1}{2} +$$

1

10

*A. M. J. N.*

✓

12

A

A

1891

$$A = 13$$
$$2 \sqrt{1 - \frac{1}{2}} = 1 \quad A$$

$21. v_1 + c_1 \beta_1 \dots$

$\partial_{1,1} \dots \partial_{1,1} \quad \partial_{1,2} \dots \partial_{1,2} \quad \partial_{1,3} \dots \partial_{1,3} \quad \partial_{1,4} \dots \partial_{1,4}$

11/11/11

4/1

$$= \frac{1}{2} A_1$$
$$A = 1^3$$

$$a = \frac{A_1}{A_2} \quad \text{or} \quad \frac{A_1}{A_2} = \frac{A_1}{A_2}$$

...

$$A_1 = \dots$$

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$$a = \frac{A_1}{A_2}$$

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Second line of handwritten text.

Third line of handwritten text.

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Sixth line of handwritten text.

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Eighth line of handwritten text.

Ninth line of handwritten text at the bottom of the page.

$$f(x) = \dots$$

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$$f(x) = \dots$$

$$f(x) = \dots$$

$$\Delta = \begin{vmatrix} \dots & \dots & \dots \\ \dots & \dots & \dots \\ \dots & \dots & \dots \end{vmatrix} \geq 0$$

$$\Delta = \begin{vmatrix} \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots \end{vmatrix}$$

1.  $\Delta_{yy} = \Delta_{yy}$

2.  $\Delta_{yy} = \Delta_{yy}$

3.  $\Delta_{yy} = \Delta_{yy}$

4.  $\Delta_{yy} = \Delta_{yy}$

5.  $\Delta_{yy} = \Delta_{yy}$

$$a'_{yy} = \frac{\Delta_{yy}}{\Delta_{yy}}$$

$$\xi = \frac{\Delta_{yy}}{\Delta_{yy}} = \frac{\Delta_{yy}}{\Delta_{yy}}$$

$$\xi'_{yy} = \frac{\Delta_{yy}}{\Delta_{yy}}$$

$$a'_{yy} = \frac{\Delta_{yy}}{\Delta_{yy}}$$

$$a_{1,1} + a_{1,2} + a_{1,3} + \dots + a_{1,n}$$

$$\frac{\Delta_{yy}}{\Delta_{yy}} = \frac{\Delta_{yy}}{\Delta_{yy}}$$

1.  $\Delta_{yy}$

2.  $\Delta_{yy}$

3.  $\Delta_{yy}$

4.  $\Delta_{yy}$

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Handwritten text, possibly a date or a small section header.

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$$f(x) = \frac{1}{x^2} = x^{-2}$$

$$f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

$$f''(x) = \frac{6}{x^4}$$

$$f'''(x) = -\frac{24}{x^5}$$

$$f^{(4)}(x) = \frac{240}{x^6}$$

$$f^{(5)}(x) = -\frac{2880}{x^7}$$

$$f^{(6)}(x) = \frac{20736}{x^8}$$

$$f^{(7)}(x) = -\frac{298592}{x^9}$$

$$f(x) = \frac{1}{x^2} = x^{-2} \quad f'(x) = -2x^{-3} = -\frac{2}{x^3}$$

$$f''(x) = \frac{6}{x^4} \quad f'''(x) = -\frac{24}{x^5}$$

$$f^{(4)}(x) = \frac{240}{x^6} \quad f^{(5)}(x) = -\frac{2880}{x^7}$$

$$f^{(6)}(x) = \frac{20736}{x^8} \quad f^{(7)}(x) = -\frac{298592}{x^9}$$

$$f^{(8)}(x) = \frac{2684352}{x^{10}}$$

$$f^{(9)}(x) = -\frac{21474912}{x^{11}}$$

$$f^{(10)}(x) = \frac{257698304}{x^{12}}$$

$$f^{(11)}(x) = -\frac{3092379648}{x^{13}}$$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = x \dot{x} + y \dot{y} + z \dot{z}$   
 $= x (x^2 + y^2 + z^2) + y (x^2 + y^2 + z^2) + z (x^2 + y^2 + z^2)$   
 $= (x^2 + y^2 + z^2) (x + y + z)$   
 $= (x^2 + y^2 + z^2) \cdot 1$   
 $= \frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$

$x^2 + y^2 + z^2 = 2t$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$   
 $\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$

$\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$   
 $\frac{1}{2} \frac{d}{dt} (x^2 + y^2 + z^2) = 1$



$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

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$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

$$u' = \frac{1}{2} \left( \frac{1}{u} + \frac{1}{v} \right) + \frac{A}{u^2}$$

11

11

$a_n d_n$

$a_n d_n$

11

$> 1$

11

$V$

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$$V = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) = 0$$

$$V = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) = 0$$

$$\left[ \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) \right]^2 \geq 0$$

$$V = -\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) = -\frac{1}{2}$$

$$\left[ \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) \right]^2 < 1$$

$$V = \frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} - \frac{1}{2} - \frac{1}{2} \right) = \frac{1}{2}$$

$$T_1 = 1$$

$$T_2 = 1/2$$

$$T_3 = 1/4$$

$$T_4 = 1/8$$

$$u_1, u_2, u_3, u_4 = 1/2$$

$$T_1 = 1/2, T_2 = 1/4, T_3 = 1/8, T_4 = 1/16$$

$$1/2 - u_1 x^2 + u_2 x^4 + u_3 x^6 + u_4 x^8 = 1$$

$$T_1 = 1/2$$

$$T_1 = 1/2, T_2 = 1/4, T_3 = 1/8, T_4 = 1/16$$

$$\frac{x^2}{2} + \frac{x^4}{4} + \frac{x^6}{6} = 1$$

$$\frac{x^2}{2} + \frac{x^4}{4} + \frac{x^6}{6} = 1$$

$$T_1 = 1/2, T_2 = 1/4, T_3 = 1/8, T_4 = 1/16$$

$$\frac{x^2}{2} + \frac{x^4}{4} + \frac{x^6}{6} = 1$$

$$\frac{x^2}{2} + \frac{x^4}{4} + \frac{x^6}{6} = 1$$

$$T_1 = 1/2, T_2 = 1/4, T_3 = 1/8, T_4 = 1/16$$

Let  $f(x) = x^2 - 1$

Find

$f'(x)$

$$f(x) = x^2 - 1 \Rightarrow f'(x) = 2x$$

$$f'(2) = 2(2) = 4$$

$$f'(0) = 2(0) = 0$$

$$f'(-1) = 2(-1) = -2$$

7. Let  $f(x) = x^3 - 2x^2 + 5x - 1$

Find

$f'(x)$

$f'(1)$

8. Let  $f(x) = x^4$

Find

$f'(x)$

$$f(x) = x^4 \Rightarrow f'(x) = 4x^3$$

$$f'(2) = 4(2)^3 = 32$$

$$\frac{1}{a} = \frac{1}{b} + \frac{1}{c} \quad \frac{1}{b} = \frac{1}{c} + \frac{1}{d}$$

$$\frac{1}{a} = \frac{1}{b} + \frac{1}{c}$$

$$\frac{1}{a} \geq 1$$

$$\frac{1}{a} \geq 1$$

$$\frac{1}{a} - \frac{1}{b} = \frac{1}{c} \quad \frac{1}{b} - \frac{1}{c} = \frac{1}{d}$$

$$\frac{1}{a} \leq \frac{1}{b}$$

$$a \geq b$$

$$a_1$$

$$a_2$$

$$a_3$$

$$m$$

$$0$$

$$X$$

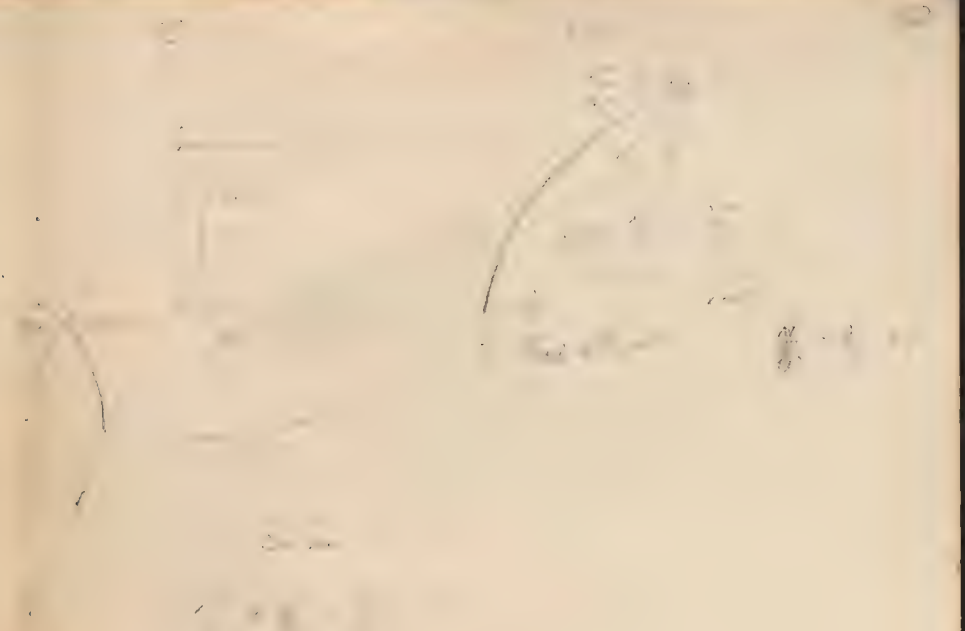
$$Y$$

$$C = m$$

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 1$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

$$m = 4 \text{ or } 1$$



$$\frac{x}{\sqrt{1-x^2}} = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{1}{\sqrt{1-x^2}} = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{1}{\sqrt{1-x^2}} = \frac{1}{\sqrt{1-x^2}}$$

$$y = \sin^{-1} x$$

$$2. \dots$$

$$y = \sin^{-1} x$$



6.6

$$\frac{1}{10} = \frac{1}{2} + \frac{1}{5} - \frac{1}{2}$$

$$2 - 1 = 1$$

1.1.1

$$1 = 1$$

$$1 = 1$$

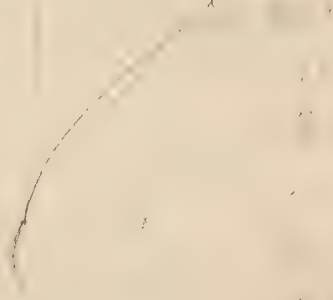
1.1

1.1

$$1 = 1$$

2

1



1

1.1

$$\frac{1}{10} = \frac{1}{2} + \frac{1}{5} - \frac{1}{2}$$

$$\frac{1}{10} = \frac{1}{2} + \frac{1}{5} - \frac{1}{2}$$

$$\frac{1}{10} = \frac{1}{2} + \frac{1}{5} - \frac{1}{2}$$

1.1

1.  $x_1$   $x_2$   $x_3$   $x_4$   $x_5$   $x_6$   $x_7$   $x_8$   $x_9$   $x_{10}$   $x_{11}$   $x_{12}$   $x_{13}$   $x_{14}$   $x_{15}$   $x_{16}$   $x_{17}$   $x_{18}$   $x_{19}$   $x_{20}$   $x_{21}$   $x_{22}$   $x_{23}$   $x_{24}$   $x_{25}$   $x_{26}$   $x_{27}$   $x_{28}$   $x_{29}$   $x_{30}$   $x_{31}$   $x_{32}$   $x_{33}$   $x_{34}$   $x_{35}$   $x_{36}$   $x_{37}$   $x_{38}$   $x_{39}$   $x_{40}$   $x_{41}$   $x_{42}$   $x_{43}$   $x_{44}$   $x_{45}$   $x_{46}$   $x_{47}$   $x_{48}$   $x_{49}$   $x_{50}$   $x_{51}$   $x_{52}$   $x_{53}$   $x_{54}$   $x_{55}$   $x_{56}$   $x_{57}$   $x_{58}$   $x_{59}$   $x_{60}$   $x_{61}$   $x_{62}$   $x_{63}$   $x_{64}$   $x_{65}$   $x_{66}$   $x_{67}$   $x_{68}$   $x_{69}$   $x_{70}$   $x_{71}$   $x_{72}$   $x_{73}$   $x_{74}$   $x_{75}$   $x_{76}$   $x_{77}$   $x_{78}$   $x_{79}$   $x_{80}$   $x_{81}$   $x_{82}$   $x_{83}$   $x_{84}$   $x_{85}$   $x_{86}$   $x_{87}$   $x_{88}$   $x_{89}$   $x_{90}$   $x_{91}$   $x_{92}$   $x_{93}$   $x_{94}$   $x_{95}$   $x_{96}$   $x_{97}$   $x_{98}$   $x_{99}$   $x_{100}$   $x_{101}$   $x_{102}$   $x_{103}$   $x_{104}$   $x_{105}$   $x_{106}$   $x_{107}$   $x_{108}$   $x_{109}$   $x_{110}$   $x_{111}$   $x_{112}$   $x_{113}$   $x_{114}$   $x_{115}$   $x_{116}$   $x_{117}$   $x_{118}$   $x_{119}$   $x_{120}$   $x_{121}$   $x_{122}$   $x_{123}$   $x_{124}$   $x_{125}$   $x_{126}$   $x_{127}$   $x_{128}$   $x_{129}$   $x_{130}$   $x_{131}$   $x_{132}$   $x_{133}$   $x_{134}$   $x_{135}$   $x_{136}$   $x_{137}$   $x_{138}$   $x_{139}$   $x_{140}$   $x_{141}$   $x_{142}$   $x_{143}$   $x_{144}$   $x_{145}$   $x_{146}$   $x_{147}$   $x_{148}$   $x_{149}$   $x_{150}$   $x_{151}$   $x_{152}$   $x_{153}$   $x_{154}$   $x_{155}$   $x_{156}$   $x_{157}$   $x_{158}$   $x_{159}$   $x_{160}$   $x_{161}$   $x_{162}$   $x_{163}$   $x_{164}$   $x_{165}$   $x_{166}$   $x_{167}$   $x_{168}$   $x_{169}$   $x_{170}$   $x_{171}$   $x_{172}$   $x_{173}$   $x_{174}$   $x_{175}$   $x_{176}$   $x_{177}$   $x_{178}$   $x_{179}$   $x_{180}$   $x_{181}$   $x_{182}$   $x_{183}$   $x_{184}$   $x_{185}$   $x_{186}$   $x_{187}$   $x_{188}$   $x_{189}$   $x_{190}$   $x_{191}$   $x_{192}$   $x_{193}$   $x_{194}$   $x_{195}$   $x_{196}$   $x_{197}$   $x_{198}$   $x_{199}$   $x_{200}$   $x_{201}$   $x_{202}$   $x_{203}$   $x_{204}$   $x_{205}$   $x_{206}$   $x_{207}$   $x_{208}$   $x_{209}$   $x_{210}$   $x_{211}$   $x_{212}$   $x_{213}$   $x_{214}$   $x_{215}$   $x_{216}$   $x_{217}$   $x_{218}$   $x_{219}$   $x_{220}$   $x_{221}$   $x_{222}$   $x_{223}$   $x_{224}$   $x_{225}$   $x_{226}$   $x_{227}$   $x_{228}$   $x_{229}$   $x_{230}$   $x_{231}$   $x_{232}$   $x_{233}$   $x_{234}$   $x_{235}$   $x_{236}$   $x_{237}$   $x_{238}$   $x_{239}$   $x_{240}$   $x_{241}$   $x_{242}$   $x_{243}$   $x_{244}$   $x_{245}$   $x_{246}$   $x_{247}$   $x_{248}$   $x_{249}$   $x_{250}$   $x_{251}$   $x_{252}$   $x_{253}$   $x_{254}$   $x_{255}$   $x_{256}$   $x_{257}$   $x_{258}$   $x_{259}$   $x_{260}$   $x_{261}$   $x_{262}$   $x_{263}$   $x_{264}$   $x_{265}$   $x_{266}$   $x_{267}$   $x_{268}$   $x_{269}$   $x_{270}$   $x_{271}$   $x_{272}$   $x_{273}$   $x_{274}$   $x_{275}$   $x_{276}$   $x_{277}$   $x_{278}$   $x_{279}$   $x_{280}$   $x_{281}$   $x_{282}$   $x_{283}$   $x_{284}$   $x_{285}$   $x_{286}$   $x_{287}$   $x_{288}$   $x_{289}$   $x_{290}$   $x_{291}$   $x_{292}$   $x_{293}$   $x_{294}$   $x_{295}$   $x_{296}$   $x_{297}$   $x_{298}$   $x_{299}$   $x_{300}$   $x_{301}$   $x_{302}$   $x_{303}$   $x_{304}$   $x_{305}$   $x_{306}$   $x_{307}$   $x_{308}$   $x_{309}$   $x_{310}$   $x_{311}$   $x_{312}$   $x_{313}$   $x_{314}$   $x_{315}$   $x_{316}$   $x_{317}$   $x_{318}$   $x_{319}$   $x_{320}$   $x_{321}$   $x_{322}$   $x_{323}$   $x_{324}$   $x_{325}$   $x_{326}$   $x_{327}$   $x_{328}$   $x_{329}$   $x_{330}$   $x_{331}$   $x_{332}$   $x_{333}$   $x_{334}$   $x_{335}$   $x_{336}$   $x_{337}$   $x_{338}$   $x_{339}$   $x_{340}$   $x_{341}$   $x_{342}$   $x_{343}$   $x_{344}$   $x_{345}$   $x_{346}$   $x_{347}$   $x_{348}$   $x_{349}$   $x_{350}$   $x_{351}$   $x_{352}$   $x_{353}$   $x_{354}$   $x_{355}$   $x_{356}$   $x_{357}$   $x_{358}$   $x_{359}$   $x_{360}$   $x_{361}$   $x_{362}$   $x_{363}$   $x_{364}$   $x_{365}$   $x_{366}$   $x_{367}$   $x_{368}$   $x_{369}$   $x_{370}$   $x_{371}$   $x_{372}$   $x_{373}$   $x_{374}$   $x_{375}$   $x_{376}$   $x_{377}$   $x_{378}$   $x_{379}$   $x_{380}$   $x_{381}$   $x_{382}$   $x_{383}$   $x_{384}$   $x_{385}$   $x_{386}$   $x_{387}$   $x_{388}$   $x_{389}$   $x_{390}$   $x_{391}$   $x_{392}$   $x_{393}$   $x_{394}$   $x_{395}$   $x_{396}$   $x_{397}$   $x_{398}$   $x_{399}$   $x_{400}$   $x_{401}$   $x_{402}$   $x_{403}$   $x_{404}$   $x_{405}$   $x_{406}$   $x_{407}$   $x_{408}$   $x_{409}$   $x_{410}$   $x_{411}$   $x_{412}$   $x_{413}$   $x_{414}$   $x_{415}$   $x_{416}$   $x_{417}$   $x_{418}$   $x_{419}$   $x_{420}$

*[Faint handwritten notes]*

$$x^1 = \frac{1}{2} \left( \frac{1}{2} - \frac{1}{2} \right) = \frac{1}{2}$$

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1875

2. 11

P. 1 / 171 - 1808



$$A_1 = 0$$

RW 5, 10/11/11

$$F' + 2\alpha_{10} + 2\alpha_{11} + \dots$$

$$F' + 2\alpha_{10} + 2\alpha_{11} + \dots$$

$$2\alpha_{10} + 2\alpha_{11} + \dots$$

$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = 1$

$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = 1$

$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = 1$

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$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = 1$

$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = 1$

$\frac{1}{2} \left( \frac{1}{2} + \frac{1}{2} \right) = 1$

$$x_1^2 + x_2^2 + x_3^2 = 1 \quad (1)$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$x_1^2 + x_2^2 + x_3^2 = 1$$

$$\Delta = \begin{vmatrix} x_1 & x_2 & x_3 & x_4 \\ x_1 & x_2 & x_3 & x_4 \\ x_1 & x_2 & x_3 & x_4 \\ x_1 & x_2 & x_3 & x_4 \end{vmatrix}$$

$$J =$$

$$x_1$$



207

- 26

|   |   |   |   |
|---|---|---|---|
| x | 1 | 1 |   |
| 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 |

$m_1 = 1$        $m_2 = 1$        $m_3 = 1$   
 $m_4 = 1$        $m_5 = 1$        $m_6 = 1$   
 $m_7 = 1$        $m_8 = 1$        $m_9 = 1$   
 $m_{10} = 1$        $m_{11} = 1$        $m_{12} = 1$

$$J = \begin{vmatrix} \frac{\partial x}{\partial u} & \frac{\partial x}{\partial v} & \frac{\partial x}{\partial w} \\ \frac{\partial y}{\partial u} & \frac{\partial y}{\partial v} & \frac{\partial y}{\partial w} \\ \frac{\partial z}{\partial u} & \frac{\partial z}{\partial v} & \frac{\partial z}{\partial w} \end{vmatrix} = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{vmatrix} = 0$$



$\frac{1}{2} \log \frac{1+x}{1-x} = \frac{1}{2} \log \frac{1+x}{1-x}$   
 $= \frac{1}{2} \log \frac{1+x}{1-x}$

$= 1$

$A' = \Delta$

$\frac{1}{2} \log \frac{1+x}{1-x}$

$$\frac{1}{2} \log \frac{1+x}{1-x} = \frac{1}{2} \log \frac{1+x}{1-x}$$

$$\frac{1}{2} \log \frac{1+x}{1-x} = \frac{1}{2} \log \frac{1+x}{1-x}$$

$$\Delta = \begin{vmatrix} 0 & a & b \\ 0 & 0 & -c \\ 0 & -c & 1 \end{vmatrix} = -a \cdot c^2 = \Delta$$

$$\Delta = \begin{vmatrix} 0 & a & b \\ 0 & 0 & -c \\ 0 & -c & 1 \end{vmatrix}$$

$$\frac{1}{2} \log \frac{1+x}{1-x} = \frac{1}{2} \log \frac{1+x}{1-x}$$

$$\frac{1}{2} \log \frac{1+x}{1-x} = \frac{1}{2} \log \frac{1+x}{1-x}$$



$\frac{1}{2} \log \frac{1}{2}$   
 $\frac{1}{2} \log \frac{1}{2}$

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$V = \frac{1}{2} \log \frac{1}{2}$

$\frac{1}{2} \log \frac{1}{2}$

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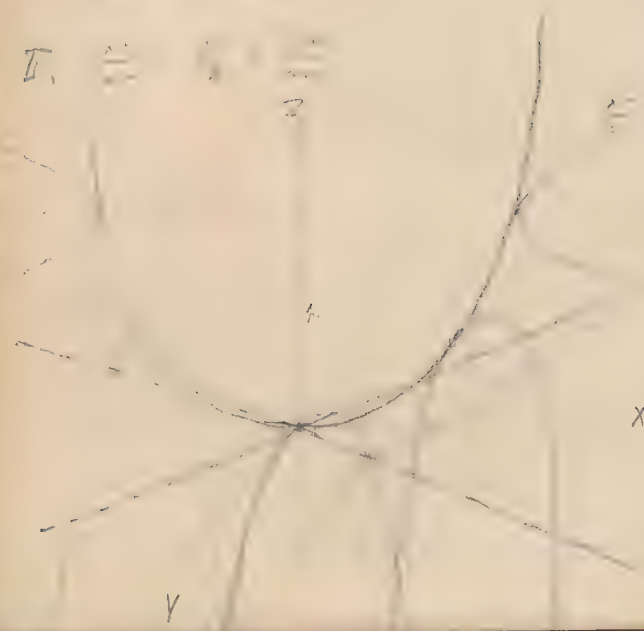
$\frac{1}{2} \log \frac{1}{2}$

$X$

$\frac{1}{2} \log \frac{1}{2}$

$\frac{1}{2} \log \frac{1}{2}$

$Y$



112 -

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1.  $\frac{1}{2} \log \frac{1}{2}$

2.  $\frac{1}{2} \log \frac{1}{2}$

3.  $\frac{1}{2} \log \frac{1}{2}$

4.  $\frac{1}{2} \log \frac{1}{2}$

5.  $\frac{1}{2} \log \frac{1}{2}$

6.  $\frac{1}{2} \log \frac{1}{2}$

7.  $\frac{1}{2} \log \frac{1}{2}$

8.

9.  $\frac{1}{2} \log \frac{1}{2}$

10.  $\frac{1}{2} \log \frac{1}{2}$

11.  $\frac{1}{2} \log \frac{1}{2}$

12.  $\frac{1}{2} \log \frac{1}{2}$

13.  $\frac{1}{2} \log \frac{1}{2}$

1. The first part of the proof is to show that



that the area of the triangle ABC is equal to the area of the triangle DEF.

Since the triangles ABC and DEF are similar, we have

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = k$$

where k is a constant.

Therefore

$$2 \times \frac{1}{2} \times AB \times BC \times \sin B = 2 \times \frac{1}{2} \times DE \times EF \times \sin E$$

$$\frac{1}{2} \times AB \times BC \times \sin B = \frac{1}{2} \times DE \times EF \times \sin E$$





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16 - 1

11. 1. 1900

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11.

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

$$(1 - \frac{1}{2}) + (1 - \frac{1}{2}) + (1 - \frac{1}{2}) + \dots$$

11. 1. 1900

1. 1. 1900

$$1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$$

$$\lambda \frac{1}{r^2} = \frac{1}{r^2} + \frac{1}{r^2} + \frac{1}{r^2} + \dots$$

$$g' = \frac{1}{r^2} - \frac{1}{r^2}$$

$$r \frac{1}{r^2} = \frac{1}{r} + \frac{1}{r} + \frac{1}{r} + \dots$$

$$= \frac{1}{r} + \frac{1}{r} + \frac{1}{r} + \dots$$

$$\frac{1}{r^2} = \frac{1}{r^2} + \frac{1}{r^2} + \frac{1}{r^2} + \dots$$

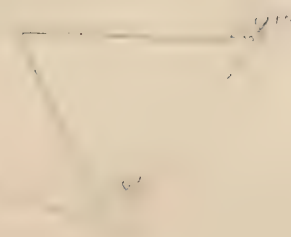
$$\frac{1}{r^2} = \frac{1}{r^2} + \frac{1}{r^2} + \frac{1}{r^2} + \dots$$

$$1 = \frac{1}{r^2} + \frac{1}{r^2} + \frac{1}{r^2} + \dots$$

$$1 = \frac{1}{r^2} + \frac{1}{r^2} + \frac{1}{r^2} + \dots$$

$$1 = \frac{1}{r^2} + \frac{1}{r^2} + \frac{1}{r^2} + \dots$$

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$$\frac{1}{6} \frac{d^2}{dt^2} + \frac{1}{2} \frac{d}{dt} - \frac{1}{2} = 0$$

$$\frac{1}{2} - \frac{1}{2} = 0$$

$\frac{1}{x} = \dots$

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1873





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1871



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(11)

11/6

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$$\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$$

$$\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}$$

11/6

1.  $\frac{1}{x^2} = x^{-2}$   
 2.  $\frac{1}{x^3} = x^{-3}$   
 3.  $\frac{1}{x^4} = x^{-4}$

4.  $\frac{1}{x^5} = x^{-5}$

$$\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$$

$$\frac{d}{dx} x^{-3} = -3x^{-4} = -\frac{3}{x^4}$$

$$\frac{d}{dx} x^{-4} = -4x^{-5} = -\frac{4}{x^5}$$

5.  $\frac{1}{x^6} = x^{-6}$

$$\frac{d}{dx} x^{-6} = -6x^{-7} = -\frac{6}{x^7}$$

$$\frac{1}{x^7} = x^{-7} \quad \frac{d}{dx} x^{-7} = -7x^{-8} = -\frac{7}{x^8}$$

$$\frac{1}{x^8} = x^{-8} \quad \frac{d}{dx} x^{-8} = -8x^{-9} = -\frac{8}{x^9}$$

$$\frac{1}{x^9} = x^{-9} \quad \frac{d}{dx} x^{-9} = -9x^{-10} = -\frac{9}{x^{10}}$$

$$\frac{1}{x^{10}} = x^{-10}$$

$$\frac{d}{dx} x^{-10} = -10x^{-11} = -\frac{10}{x^{11}}$$

$$\frac{1}{x^{11}} = x^{-11}$$

$$\frac{d}{dx} x^{-11} = -11x^{-12} = -\frac{11}{x^{12}}$$

$$\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$$

1.  $\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$

2.  $\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$

$$\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''} = 1$$

3.  $\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$

$$\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''} = 1$$

4.  $\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$

$$\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''} = 1 - \frac{m}{d'}$$

$$\frac{1}{d(1-\frac{m}{d'})} = \frac{1}{d' + d''} = 1$$

$$d' + d'' = d' + d'' = 1$$

5.  $\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$

6.  $\frac{1}{d} = \frac{1}{d'} + \frac{1}{d''}$

2. inner wach  $\beta$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

$f(x,y,z) = 0$

$$\frac{x^2}{a_1^2} + \frac{y^2}{b_1^2} + \frac{z^2}{c_1^2} = 1$$

$$x^2 \left[ \frac{1}{a^2} - \frac{1}{a_1^2} \right] + y^2 \left[ \frac{1}{b^2} - \frac{1}{b_1^2} \right] + z^2 \left[ \frac{1}{c^2} - \frac{1}{c_1^2} \right] = 0$$

$$\begin{cases} f=0 \\ f'=0 \end{cases} \Rightarrow \text{radial}$$

2. inner  $\beta$

$$x^2 \left[ \frac{1}{a^2} - \frac{1}{a_1^2} \right] + y^2 \left[ \frac{1}{b^2} - \frac{1}{b_1^2} \right] + z^2 \left[ \frac{1}{c^2} - \frac{1}{c_1^2} \right] = 0$$



$-x^2 - y^2$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$$

$$x^2 \left[ \frac{1}{a^2} - \frac{1}{a_1^2} \right] + y^2 \left[ \frac{1}{b^2} - \frac{1}{b_1^2} \right] + z^2 \left[ \frac{1}{c^2} - \frac{1}{c_1^2} \right] = 0$$

1. outer  $\beta$   $x^2 - y^2$

2. inner  $\beta$   $x^2 - y^2$

$$x^2 \left[ \frac{1}{a^2} - \frac{1}{a_1^2} \right] + z^2 \left[ \frac{1}{c^2} - \frac{1}{c_1^2} \right] = 0$$



BJ

1/5

15/4

25/2

18/2



